MASTER THESIS

SETTING UP THE INNOVATION PARTNERSHIP

DESIGNING A GUIDE FOR PROJECT MANAGERS OF DUTCH CONTRACTING AUTHORITIES WITH A DEMAND FOR CONSTRUCTION-RELATED INNOVATION

Jesse van der Mieden

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Albert Einstein
(1946)

"The world we created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them."

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PREFACE

Your first thought when seeing the front page of this thesis could have been: “Hey an elephant!”, or: “What is the relationship between elephants and the innovation partnership?” or, for the observant viewer: “these elephants cross from the left to right, while the sign indicates otherwise.”

During the past months, I became extra aware that people have the tendency to do what they are used to do. We are just walking our elephant trail because we know it leads us to where we want. Not that it is wrong. It has many benefits to use proven methods. However, it can also withhold us from reaching our goals. Therefore, sometimes we need to deviate from our trail and pave a new one. Maybe one perpendicular to our trail. Maybe one in the opposite direction. Every new situation requires a new consideration. The environmental challenge we are facing is such a situation. It does not only need us to change our fundamental choices. It might even need us to change what we do or do not like. It needs us to change the status quo.

I think the built environment is a perfect place to start. Not only because it is thematic. But because I experienced that the construction industry is a big elephant trail. I think the innovation partnership is a tool we can embrace to start building zebra crossings and to indicate new directions. Maybe not because of its actual characteristics, but because of its naming. And because of the possibilities it showed me.

This research is conducted to complete the master Construction Management and Engineering at Delft University of Technology. This research was not only the last step to take to finish my studies. It also was a process full of adventures. It was a quest, it sometimes was (mildly put) frustrating, but most of all, (again, mildly put) it has been very instructive. Resulting in both new and improved skills, and a research which I am incredibly proud of.

I owe much gratitude to the people who helped me to expand my limits. My graduation committee: Monika Chao-Duivis for her writing tips and guidance through procurement country; Mark de Bruijne, for his admirable endless willingness to discuss, reflect and correct; Marleen Hermans, for her critical notes and ever sharp analyses; and Wouter Roemaat for his continuous support, trust, wake-up calls and coaching on both a practical and social level; all to reach the best result for this research. My colleagues at Alba Concepts, who provided me a warm bath full of humour, room for development, discoveries, inspiration and support. All practitioners who helped me with or took part in explorative conversations, interviews, verification and validation sessions. My family: my parents for their continuous support to absorb as much education as possible, to develop myself into the person I am, for their creativity, their sensitivity, their stubbornness, their listening while not understanding half of what I do and still being proud. And my brother and sister for inspiring me, for being who they are and for working on my nerves. My friends, who supported me by being musically, sporting, adventurous, epicurean, humorous, linguistic, practical, annoying, supportive and creative. Thanks to all of you.

Jesse van der Mieden, November 2018

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Appendix

Guide

ABBRIVIATIONS AND DEFINITIONS

All abbreviations and definitions which are used in this research, are explained throughout the report. However, some words require special attention to minimise ambiguity. These words are:

Aspect	Definition
Contracting authority	Examples of contracting authorities are: The 'Rijksvastgoedbedrijf', 'Rijkswaterstaat', a province, a municipal authority and a water board. Because of its comprehensiveness, the exact definition is provided in appendix 01.05.
Procurement procedure	In this thesis, the word 'procedure' refers to a procurement procedure as described in European and Dutch procurement law. Examples of the procedures are: the open procedure, the restricted procedure, the competitive dialogue, the competitive procedure with negotiation and the innovation partnership. The context in which these procedures can be applied, is discussed in chapter 03 and appendix 01.08.
Procurement process	'Procurement process' indicates a certain set-up of the combination of three main phases of the innovation partnership: the pre-procurement phase, the procurement phase and the contracting/partnering-phase. The set-up of the procurement phase is equal to the set-up of the procurement procedure.
Procurement approach	A procurement approach is a collective name for types of set-ups of a procurement process. A well-known example is 'Best Value Procurement'.
Creative process	A creative process is a process in which diverging, clustering and converging activities take place. The process exists of a problem space and a solution space which are iteratively connected. A creative process is part of an innovation process. This is further discussed in chapter 08.
Design process	A design process enhances working out an idea.
Development process	In this research, the concept 'development process' is used, to refer to research and development activities and commercial development activities. The definitions of these two development activities are provided in chapter 03.
Innovation process	The innovation process reaches from ideation to commercialisation [§08.01]. The combination of research and development activities and commercial development activities can be considered equal to the innovation process.

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SUMMARY

Characteristics of the innovation partnership

The innovation partnership is a new procurement procedure, which is specifically designed by the European Commission to combat the challenges the European Union faces, such as: climate change, energy & resource efficiency, health and demographic change. The innovation partnership is intended to strengthen and integrate the innovation chain, facilitating research, development and commercial purchase of an innovative product, work or service in a single procurement procedure (European Commission, 2010, p. 10). This innovation can be something 'new' or 'significantly improved' which is verified to be not (yet) available on the market. Facilitating this distinctive 'single procurement procedure' characteristic, the innovation partnership recognises three, relatively unknown, features of procurement law (Directive 2014/24/EU Art 31, Dutch procurement law 2012 (2016) Art 2.31a, §2.3.8.7a):

- The possibility to let the development process take place before and/or after the awarding of a contract.
- The possibility to award a contract to multiple parties.
- The possibility to progress the funnelling after the awarding of a contract, by applying go/no-go moments.

Research relevance, research objective and research question

The experience of Dutch contracting authorities with the innovation partnership is limited, especially for procurement projects in the built environment (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.). This research was conducted to provide additional knowledge about the innovation partnership, by particularly aiming at the development of a guide to assist project managers of contracting authorities to set up an innovation partnership. The main research question, following the research objective, is:

> *How to set up the procurement procedure of the innovation partnership for contracting authorities with a demand for construction-related innovation, such that the right partner can be selected for the development process towards the fulfilment of the contracting authority's ambition?*

Research methodology

Because of the novelty of the innovation partnership and the limited practitioner experience with the practical applicability of the procedure, relatively little information exists that could help to identify requirements for the guide. Because of this lacking information and data, a mixed method approach of explorative qualitative research and development-based design research are employed to design the guide. Twelve more or less iterative steps were undertaken. A first round of literature studies was conducted, to find scientific grounding for the interview process. Twenty-six interviews were held to (1) identify and verify the characteristics and legal aspects which affect the innovation partnership; (2) to identify and classify the types of innovation for which the innovation partnership can be applied; And (3) to identify suggestions for the set-up of the procedural aspects of the innovation partnership per type of construction-related innovation. A second round of literature studies was done to find both extra clarification for the data as found in practice and to identify challenges for and steps in a development process for construction-related innovation. Subsequently, the key determinants for the set-up of the innovation partnership were verified and validated by a focus group. To conclude, the design of the guide was validated by various practitioners through nine consecutive individual checks and two plenary discussions.

Research results

The innovation partnership can be applied by contracting authorities with a demand for something 'new' or 'significantly improved' which is verified to be not (yet) available on the market. The development process towards this 'innovation', requires facilitation of a creative process (Buijs & Van der Meer, 2013; Nyström, 1979). This research indicates how to merge this iterative creative process with procurement law's linear procurement process, when applying the innovation partnership for projects in the built environment. The creative process has three characteristics:

Firstly, three parties should be involved (Buijs & Van der Meer, 2013; Tassoul, 2009):

- The problem owner: a contracting authority;
- A creative facilitator: generally, an independent process advisor;
- A resource group, existing of tenderers / candidates.

Secondly, the creative process includes a problem space and a solution space [figure 1[1]]. The objective of this subdivision is to facilitate questioning the frames of reference of the problem owner and to open up the potential solution space. In the problem space and solution space, three main deliverables can be identified. The development partners should work towards these deliverables via five activities, which are iteratively connected and in which diverging, clustering and converging takes place. The deliverables and activities are:

- Definition of the challenge;
    - Diverging to understand the complexity of the challenge.
    - Clustering and converging to [re-]define or [re-]frame the challenge.
- [Re-]framed problem;
    - Idea generation (diverging) and selection (clustering and converging).
    - Prototyping.
    - Testing.
- Solution.

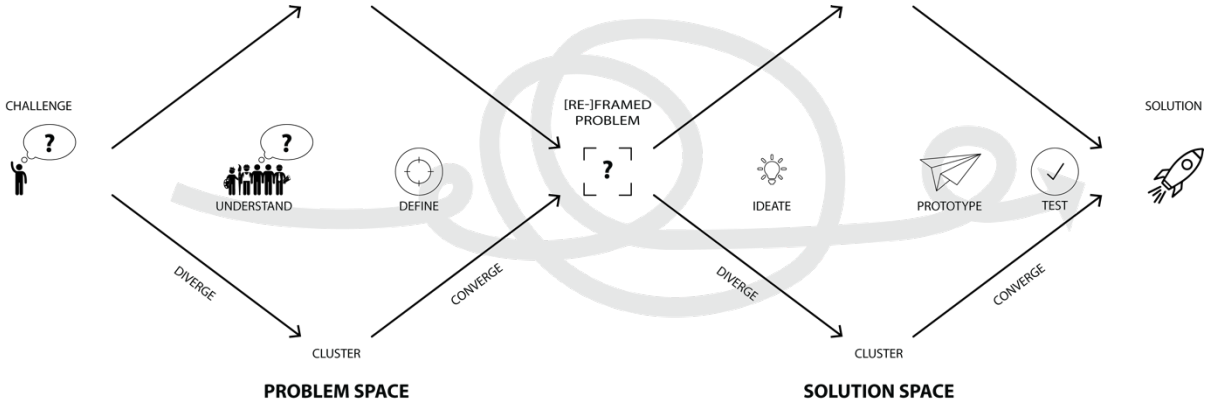


figure 1: a creative process

Thirdly, a creative process demands unrestricted, rapid and direct interaction and feedback (Buijs & Van der Meer, 2013; Edler et al., 2005). The unrestricted, rapid and direct character of this type of interaction requires the addition of a 'creative playing field' (respect, trust, discreteness, reciprocity, acceptance) to the well-known 'level playing field' (equal treatment, transparency, proportionality).

This research indicated that the innovation partnership facilitates three moments in which this interaction and feedback between the contracting authority, creative facilitator and tenderers could take place:

- Preliminary to the procurement process, in a market consultation.

[1] Image by author, based on The Design Council (2018) and Voûte (2018). Altered after Buijs & Van der Meer (2013).

- During the procurement process, in negotiation rounds.
- After the awarding of a contract, in the contracting/partnering-phase.

Based on the identified characteristics, requirements, principles and moments, the innovation partnership guide was developed. This guide describes seventeen key procedural aspects, divided over five parallel processes: demand formulation, partner finding, solution finding, commercialisation and reflection. The phases of the procurement process are indicated at the top of figure 2. The deliverables and activities of the creative process are vertically depicted at the bottom of this figure.

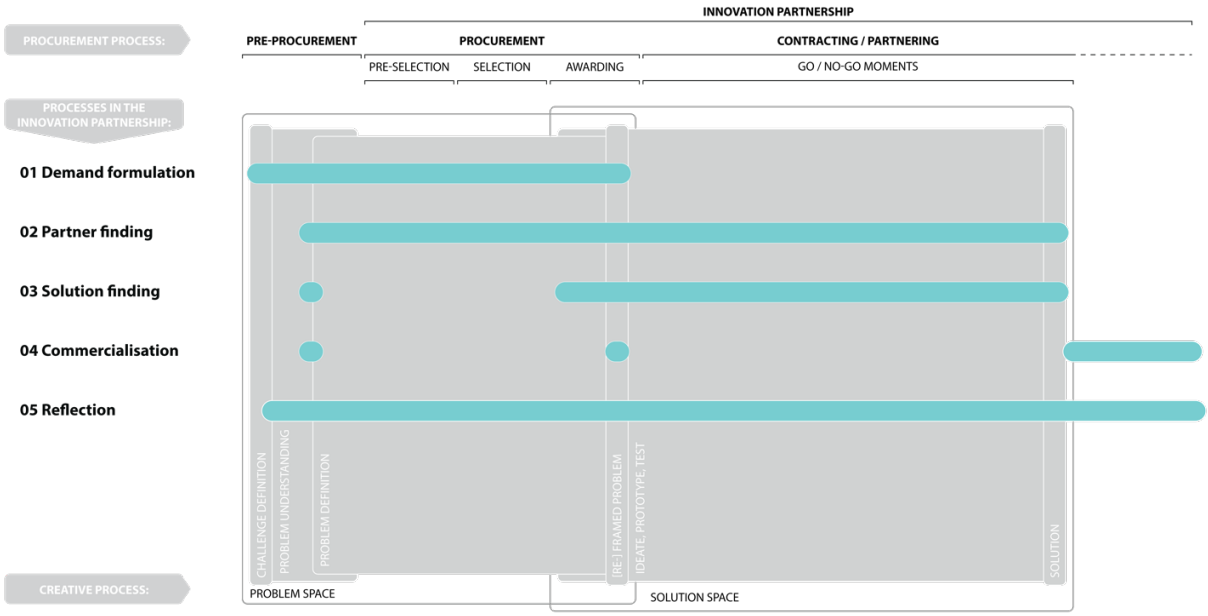


figure 2: visualisation of the guide for the set-up of the innovation partnership for construction-related innovation demands

Conclusion

This research indicated various options to set-up the innovation partnership. To provide clarity in the complexity of the procedure, two extremes were identified and discussed:

- For the development of something 'significantly improved' it is recommended to let idea generation & selection activities take place before the awarding of a contract. Prototyping & testing activities should take place after the awarding of a contract. This set-up facilitates to award tenderers on amongst others their suggested ideas, while the major part of the creative and iterative process is facilitated under contract terms. This anticipates on the, by practitioners indicated, request for discreteness, reciprocity and financial feasibility regarding the (outcomes of an) innovation process. The division of activities in this procurement set-up, approaches the, in the Dutch construction industry, ingrained way of procurement which is often used when a contracting authority already knows what (type of) solution it is buying.
- For the development of something 'new' it is recommended to place both idea generation & selection and prototyping & testing activities in the contracting/partnering-phase, initially leaving the exact solution (direction) ambiguous. This set-up suits the requirements for a creative process best: leaving solution directions completely open and instead focussing on the formulated challenge. The solution direction subsequently follows logically from the problem analysis and the diverging, clustering and converging activities. This option requires awarding on innovation potential and interaction match, which can be measured by tools such as a creative equity scan (Versteeg, Van Berlo, & Caeldries, 2018) and a collaboration assessment.

Discussion

This research showed that there is tension between the requirements for innovation processes and procurement processes. It was indicated that practitioners in the Dutch construction industry badly recognize the room procurement law facilitates for creativity. Moreover, practitioners find it difficult to facilitate creativity in procurement processes which are aimed at selection of (a) suitable partner(s) for the development of a construction-related innovation. Because practitioners have the tendency to stick to the frequently used and ingrained set-up approaches for procurement processes, it remains to be seen whether the innovation partnership will be used to its full potential. Multiple contracting authorities see the potential of the innovation partnership and have been trying to set-up the procedure (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.). However, it appears to be a real challenge to meet all practitioners demands.

Recommendations for further research

As indicated, the European and Dutch legislator included three relatively unknown aspects of procurement law in the legal description of the innovation partnership. These three aspects form a very important part of the potential set-ups which this research proposes for the innovation partnership. However, these three aspects are not solely restricted for application in the innovation partnership. The recommended set-ups of the procedure can also be used to facilitate R&D processes in other procurement procedures. Therefore, the results of this research reach further than the design of a guide for the set-up for the innovation partnership. The verification of this assumption could be researched by applying this guide for procuring demands for construction-related innovation and using another procedure than the innovation partnership.

In line with these findings, it is recommended to retrieve better practical understanding about the creative process in the context of the Dutch built environment. This understanding can facilitate: (1) improvement of this guide, including when it is used for the set-up of other procurement procedures; and (2) the development of creativity tools for (sub-phases of) creative processes in the context of procurement projects in the built environment. This practical information could be retrieved through interviews with amongst others (independent) innovation- and creativity manager which operate in sub-sectors of the Dutch built environment.

SAMENVATTING

Karakteristieken van het innovatiepartnerschap
Het innovatiepartnerschap is een nieuwe aanbestedingsprocedure die is ontworpen door de Europese Commissie als reactie op de uitdagingen waar de Europese Unie voor staat: klimaatverandering, energie- & grondstofefficiëntie, gezondheid en demografische veranderingen.
Het innovatiepartnerschap is geïntroduceerd om de innovatieketen te versterken en te integreren door ontwikkeling en grootschalige inkoop van een innovatief product, innovatief werk of innovatieve dienst mogelijk te maken in één aanbestedingsprocedure (European Commission, 2010, p. 10). Deze innovatie kan iets nieuws zijn, of iets dat significant verbeterd is. Voor beiden geldt dat het (nog) niet op de markt beschikbaar mag zijn. Verder worden er in de beschrijving van het innovatiepartnerschap drie, relatief onbekende, kenmerken van het aanbestedingsrecht genoemd (Richtlijn 2014/24/EU Art 31, Aanbestedingswet 2012 (2016) Art 2.31a, §2.3.8.7a):

- De mogelijkheid om een ontwikkelproces te laten plaatsvinden voor en/of na het gunnen van een contract.
- De mogelijkheid om te gunnen aan meerdere partijen.
- De mogelijkheid om het selectieproces te laten doorlopen na het gunnen van een contract, middels go/no-go momenten.

Onderzoeksdoel
Nederlandse aanbestedende diensten hebben beperkte ervaring met het toepassen van het innovatiepartnerschap, vooral voor bouwgerelateerde innovatieopgaven (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.). Dit onderzoek heeft als doel om extra kennis te verstrekken over het innovatiepartnerschap, door een gids te ontwikkelen om projectmanagers van aanbestedende diensten te helpen met het opzetten van een innovatiepartnerschap. De hoofdvraag die voortkomt uit dit onderzoeksdoel, luidt:

> *Hoe moet een Nederlandse aanbestedende dienst met een vraag naar bouwgerelateerde innovatie het innovatiepartnerschap inrichten, zodat de juiste partners kunnen worden geselecteerd voor een ontwikkelproces richting de beantwoording van hun ambities?*

Onderzoeksmethodologie
Door het nieuwe karakter van het innovatiepartnerschap en de gelimiteerd kennis die mensen uit de praktijk hebben met de praktische toepassing van de procedure, is er weinig informatie beschikbaar die zou kunnen helpen met het identificeren van de behoeften voor een gids. Door het ontbreken van deze informatie en data, is er gekozen om de gids te ontwerp op basis van een combinatie van exploratief kwalitatief onderzoek en ontwikkelingsgerelateerd ontwerponderzoek. Hiervoor zijn twaalf (iteratieve) stappen ondernomen. Het onderzoek is gestart met een eerste literatuuronderzoek. Dit had als doel om wetenschappelijke gronding te vinden voor het interview proces. Vervolgens zijn er zesentwintig interviews afgenomen om: (1) de karakteristieken en juridische aspecten die het innovatiepartnerschap beïnvloeden te identificeren en te verifiëren; (2) de types innovatie waarvoor het innovatiepartnerschap kan worden gebruikt te identificeren en classificeren; en (3) om informatie te vergaren voor het opzetten van een innovatiepartnerschap per type bouwgerelateerde innovatie. Een tweede literatuuronderzoek maakte het mogelijk om deze praktijkinformatie te duiden. Daarnaast zijn de uitdagingen en stappen voor het ontwikkelproces van bouwgerelateerde innovatie in kaart gebracht. Vervolgens zijn de kernaspecten voor het opzetten van het innovatiepartnerschap door een focus groep geverifieerd en gevalideerd. Tot slot is het ontwerp en de inhoud van de gids gevalideerd door meerdere personen uit de praktijk door middel van negen opeenvolgende individuele controles en twee plenaire discussies.

Onderzoeksresultaat

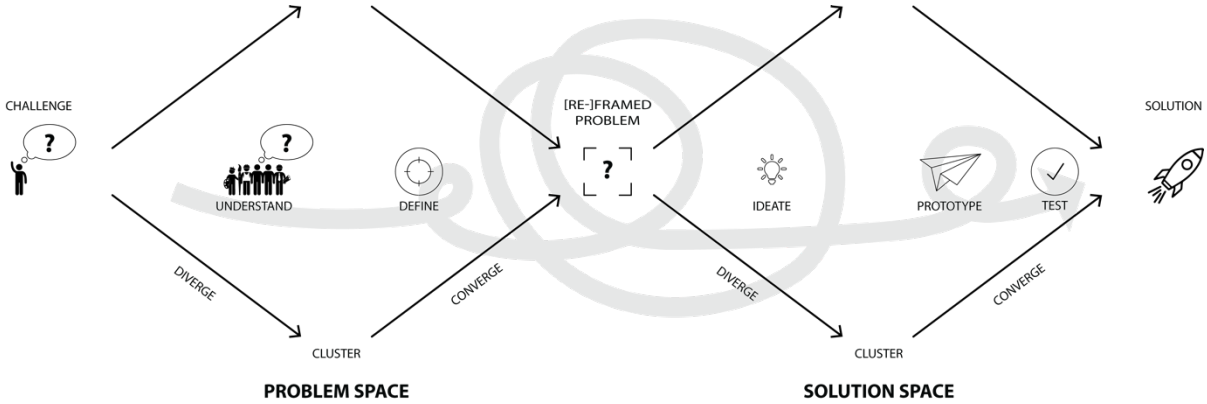
Het innovatiepartnerschap mag worden gebruikt door aanbestedende diensten die opzoek zijn naar een innovatie. Deze innovatie kan iets nieuws zijn, of iets dat significant verbeterd is. Voor beiden geldt dat het (nog) niet op de markt beschikbaar mag zijn. Literatuur onderzoek laat zien er creativiteit nodig is om het ontwikkelingsproces, dat kan leiden tot deze innovatie, mogelijk te maken (Buijs & Van der Meer, 2013; Nyström, 1979). Dit onderzoek laat zien hoe dit iteratieve creatieve proces kan worden samengevoegd met het lineaire aanbestedingsproces in een innovatiepartnerschap, wanneer deze procedure wordt ingezet voor projecten in de bebouwde omgeving. Het creatieve proces kent drie karakteristieken:

Ten eerste moeten er drie partijen bij worden betrokken (Buijs & Van der Meer, 2013; Tassoul, 2009):

- Een probleemeigenaar: de aanbestedende dienst;
- Een creativiteitsmanager: doorgaans een onafhankelijk adviseur;
- Een groep probleemoplossers, bestaande uit inschrijvers/kandidaten.

Ten tweede bevat een creatief proces een probleemruimte en een oplossingsruimte [figuur 3[2]]. Het doel van deze onderverdeling is om het referentiekader van de probleemeigenaar open te breken, alvorens in te gaan op eventuele oplossingsrichtingen. De probleemruimte en oplossingsruimte bevatten drie op te leveren producten, die kunnen worden samengesteld middels vijf activiteiten die iteratief met elkaar zijn verboden. In elk van deze activiteiten vindt divergentie, clustering en convergentie plaats. Deze producten en activiteiten zijn:

- Definitie van de uitdaging;
    - Divergeren om de complexiteiten van het probleem te begrijpen.
    - Clusteren en convergeren voor de [her]definitie en [her]kadering van de uitdaging.
- [Her]formulering van het probleem;
    - Het genereren van het idee (divergeren) en selectie van het idee (clusteren en convergeren).
    - Het maken van een prototype.
    - Het testen van een prototype.
- Oplossing.



figuur 3: een creatief proces

Ten derde is het voor een creatief proces van belang dat er onbeperkte, snelle en directe interactie en terugkoppeling mogelijk is (Buijs & Van der Meer, 2013; Edler et al., 2005). Hiervoor is naast een 'gelijkwaardig speelveld' - die bestaat uit het gelijkheidsbeginsel, het transparantiebeginsel en het

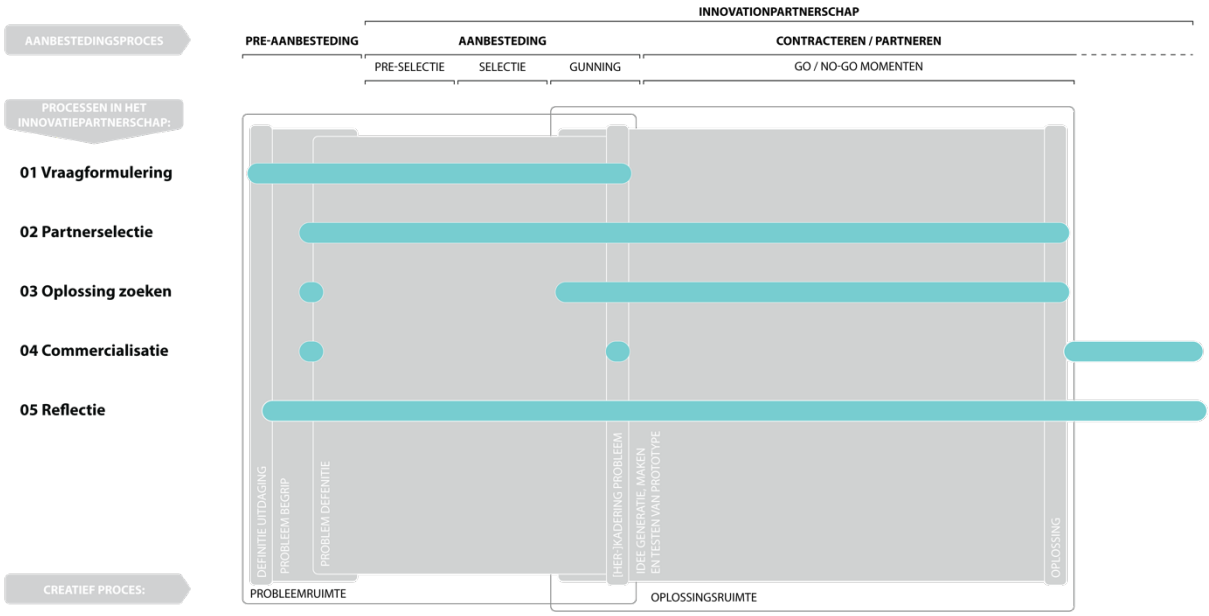
[2] Afbeelding door auteur, gebaseerd op The Design Council (2018) en Voûte (2018). Wijzigingen zijn gebaseerd op Buijs & Van der Meer (2013).

proportionaliteitsbeginsel - ook een ‘creatief speelveld’ benodigd - die bestaat uit respect, vertrouwen, eerlijkheid, wederkerigheid en acceptatie.

Dit onderzoek laat zien dat het innovatiepartnerschap drie momenten faciliteert waarop deze interactie en terugkoppeling tussen opdrachtgevers, creativiteitsmanagers en opdrachtnemers kan plaatsvinden:

- Voorafgaande aan het aanbestedingsproces, middels een marktconsultatie.
- Tijdens het aanbestedingsproces, in de onderhandelingsrondes.
- Na het gunnen van het contract, in de contract-/partnerfase.

De geïdentificeerde karakteristieken, benodigdheden, principes en momenten zijn vervolgens verwerkt in de innovatiepartnerschapgids. De gids beschrijft zeventien procedurele kernaspecten, verdeeld over vijf parallelle processen: vraagformulering, partnerselectie, oplossing zoeken, commercialisatie en reflectie. In figuur 4 zijn de fases van het aanbestedingsproces afgebeeld aan de bovenzijde. De producten en activiteiten die ten grondslag liggen aan het creatieve proces, zijn afgebeeld aan de onderzijde van het figuur.



figuur 4: visualisatie van de gids voor het opzetten van het innovatiepartnerschap voor bouwgerelateerde innovatievraagstukken

Conclusie

Dit onderzoek laat zien dat er verscheidene opties zijn om het innovatiepartnerschap in te richten. Om enige duidelijkheid te verschaffen in de complexiteit van de procedure, zijn er twee uitersten geïdentificeerd en bediscussieerd:

- Voor de ontwikkeling van een significant verbeterd product, werk of dienst, kunnen de ideegeneratie & ideeselectie activiteiten het beste plaatsvinden vóór het gunnen van een contract. Het maken en het testen van een prototype kunnen het beste plaatsvinden na de gunning van een contract. Deze opzet faciliteert om inschrijvers te beoordelen op hun idee, terwijl het grootste deel van het creatieve en iteratieve proces kan plaatsvinden onder contractvoorwaarden.

  Deze aanpak sluit aan op het verzoek van mensen uit de praktijk om op een discrete manier met het ontwikkelde idee om te gaan. Ook kan er op deze manier rekening worden gehouden met het wederkerigheidsprincipe en de financiële haalbaarheid van het innovatieproces. Deze verdeling van activiteiten lijkt op de, in de Nederlandse bouwsector, ingewortelde manier van

aanbesteden, die veelal wordt gebruikt wanneer opdrachtgevers weten wat voor (type) oplossing ze willen kopen.

- Voor de ontwikkeling van een nieuw product, werk of dienst, kunnen zowel de ideegeneratie & ideeselectie activiteiten als het maken en testen van het prototype, het beste plaatsvinden na het gunnen van een contract. Hiermee blijft de exacte oplossing of oplossingsrichting in eerste instantie onduidelijk. Deze opzet sluit het beste aan bij de benodigdheden voor een creatief proces: laat de oplossingsrichting helemaal open en focus voornamelijk op de geformuleerde uitdaging. De oplossingsrichting volgt vervolgens logisch vanuit de probleemanalyse en de divergentie-, cluster- en convergentie activiteiten. Bij deze manier van aanbesteden kan er worden gegund op innovatiepotentieel en interactie-klik. Deze aspecten kunnen worden gemeten middels een 'creative equity scan' (Versteeg et al., 2018) en een samenwerkingsassessment.

Discussie

Dit onderzoek heeft laten zien dat benodigdheden voor een innovatieproces en een aanbestedingsproces op gespannen voet staan met elkaar. Er is aangetoond dat mensen uit de Nederlandse bouwpraktijk moeite hebben met het zien van mogelijkheden die de aanbestedingswet biedt voor het faciliteren van creativiteit. Daarnaast blijkt dat deze men het moeilijk vindt om creativiteit te faciliteren in aanbestedingsprocessen die gericht zijn op het selecteren van (een) geschikte partner(s) voor het ontwikkelen van bouwgerelateerde innovatie. Mensen uit de praktijk hebben de neiging om vast te houden aan de veelgebruikte en ingewortelde manier van aanbesteden. Daarom zal nog moeten blijken of het innovatiepartnerschap echt tot zijn recht komt. Hoewel verschillende opdrachtgevers het potentieel van de procedure herkennen (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.), blijkt het lastig om te voldoen aan de behoeften van alle deelnemende partijen.

Aanbevelingen voor nader onderzoek

Zoals hierboven is aangegeven benoemen de Europese en Nederlandse wetgever drie, relatief onbekende, kenmerken van het aanbestedingsrecht in de beschrijving van het innovatiepartnerschap. Deze drie kenmerken vormen een belangrijk onderdeel van de aanbevelingen voor het opzetten van een innovatiepartnerschap. Deze aspecten zijn niet alleen in te zetten voor een innovatiepartnerschap; ze kunnen ook worden gebruikt om R&D-processen mogelijk te maken in andere aanbestedingsprocedures. Daarom reiken de resultaten van dit onderzoek verder dan de ontwikkeling van een gids voor het opzetten van een innovatiepartnerschap. Deze aanname kan worden geverifieerd door deze gids in te zetten voor de inrichting van deze andere aanbestedingsprocedures wanneer ze worden gebruikt voor het inkopen van bouwgerelateerde innovatie.

In lijn met deze bevindingen wordt het aangeraden om nader onderzoek te verrichten naar creatieve processen in de context van de bebouwde omgeving. Een beter begrip van dit proces kan het mogelijk maken om (1) deze gids te verbeteren, ook wanneer deze wordt gebruikt voor het inrichten van andere aanbestedingsprocedures dan het innovatiepartnerschap; en (2) om hulpmiddelen voor (deelfases van) creatieve processen in bouwgerelateerde aanbestedingstrajecten te ontwikkelen. Deze praktische informatie kan worden verkregen door onder andere (onafhankelijk) innovatie- en creativiteitsmanagers te interviewen die werkzaam zijn in deelsectoren van bouwend Nederland.

01 INTRODUCTION

01.01 Context of this research

The innovation partnership is a new procurement procedure, which is specifically designed by the European Commission to combat the challenges the European Union faces, such as: climate change, energy & resource efficiency and health & demographic change. The innovation partnership is intended to strengthen and integrate the innovation chain, facilitating research and commercialisation in a single procurement procedure (European Commission, 2010, p. 10). It mandates the development and subsequent purchase of resulting supplies, services or works which cannot be met by solutions already available on the market (Directive 2014/24/EU Art 31, Dutch procurement law 2012 (2016) Art 2.31a, §2.3.8.7a).

Procurement is important to stimulate innovation in the production of the built environment (European Commission, 2018, p. 11). Almost half of the contracting authorities seek innovative products, solutions and services in their procured demands (Telles & Butler, 2014, p. 24). Moreover, many argue that governments have a central role in the promotion and support of innovation in the production of the built environment via demand-side focussed regulatory frameworks, such as public procurement for innovation (Arnoldussen, Groot, Halman, & Zwet, 2017, p. 62; Borrás & Edquist, 2013, p. 1517; European Commission, 2011b, p. 18; Gann, 2000, p. 230; Hermans & Eisma, 2015, p. 1; MacMillan, 2001, pp. 251, 252; Pries & Dorée, 2005, p. 563; Zelenbabic, 2015, p. 262). The Dutch public sector is aware of this role. Furthermore, it has the capabilities to stimulate construction-related innovation (Nyiri, Osimo, Özcivelek, Centeno, & Cabrera, 2007, p. 30)[1].
Although critics like Edler et al. (2005, p. XI) argue that there is a lack of knowledge about the effectiveness of procurement of innovation, procurement as a policy instrument is considered to have a positive influence on innovation processes (Amann & Essig, 2015, p. 282; Aschhoff & Sofka, 2009, p. 1235; Edler & Georghiou, 2007, p. 949; Edquist, 2015, p. 0; Edquist, Vonortas, Zabala-Iturriagagoitia, & Edler, 2015, p. 1; Edquist & Zabala-Iturriagagoitia, 2012, p. 1757; Geroski, 1990, p. 182; Lember, Kattel, & Kalvet, 2014, pp. 1, 2; Pries & Dorée, 2005, p. 563; Uyarra & Flanagan, 2010, p. 123).

01.02 Problem definition

The innovation partnership was introduced in Dutch procurement law relatively recently on July 1st, 2016. Because of the preparation- and progress time of a procurement process, and the restricted application of the innovation partnership (Ted, n.d.; TenderNed, n.d.), the experience of Dutch contracting authorities with this procedure in the context of the built environment is still limited (Hofmeijer & Rasenberg, 2018).
The recent introduction of the procedure may result in two potential problems for contracting authorities. First of all, Dutch contracting authorities could all in parallel start to develop research into a suitable set-up for the innovation partnership. And secondly, problems might arise when individuals working in these contracting authorities misinterpreting the possibilities of the procedure (Hofmeijer, 2017, p. 16).

The latter problem originates from the widespread use of more or less 'standardised' and frequently used approaches for the set-up of procurement procedures. In literature three, for this research important, procurement approaches are differentiated:

[1] This awareness and the capabilities are demonstrated in several (recently) implemented measures such as: knowledge centre for procurement: PIANOo, financial support, agendas and policy instruments such as: agreements and procurement law (Arnoldussen et al., 2017; Berg et al., 2014; European Commission, 2010; Rijksvastgoedbedrijf, n.d.; Rijkswaterstaat, 2017; Sociaal-Economische Raad, 2013, 2018; United Nations, 2015).

- An approach in which a contracting authority already knows *what solution* it is buying. In this approach, research and development activities [further R&D] occur before the start of the procurement process. This approach is considered for purchasing off-the-shelve products such as office supplies (Edler et al., 2005, p. I; European Commission, 2018, pp. 8, 45).
- An approach in which a contracting authority already knows *what type of solution* it is buying. In these processes, R&D occurs during the procurement process. This process is concluded with the signing of the contract when the exact features off the solution are agreed upon. This approach is frequently used for complex construction projects and can be recognised by the dialogue or negotiation moments which are used to determine and to fine-tune the exact features (Edler et al., 2005, p. I; European Commission, 2018, pp. 8, 45; Ted, n.d.; TenderNed, n.d.).
- An approach in which R&D occurs *after* the awarding of the contract. With this approach, the contracting authority buys R&D activities leading to the development of something which does not exist (yet). This approach is amongst others facilitated by the innovation partnership (European Commission, 2018, p. 45; Rijksoverheid, 2016a, p. 10).

In particular the first two approaches are frequently used in practice. These approaches are therefore ingrained in the Dutch construction industry and in contracting authorities in particular (PIANOo, 2018b; Roemaat, 2017; TenderNed, n.d.). As a result, the extensive experience of practitioners with these approaches, positively influences the predictability of risks which might occur during the purchasing process or thereafter in the construction phase (Arnoldussen et al., 2017, p. 31). Because the Dutch construction industry is an industry with minimal margins (Arnoldussen et al., 2017, pp. 30, 31; Koenen, 2015), this predictability is a characteristic which is highly attractive for risk averse contracting authorities and contractors (Amann & Essig, 2015, p. 282; Arnoldussen et al., 2017, p. 32; Uyarra & Flanagan, 2010, p. 134). However, when situations require both providers of new innovative solutions and public contract authorities to deviate from these 'standard' approaches, many uncertainties and risk arise. This research aims to understand and uncover some of them. For example, the development of something which does not exist yet, results in more (elaborate) requirements for feedback mechanisms and interaction between the contracting authority and the tenderers than does procurement for less innovative products (Edler et al., 2005, p. I, 9, 203; Edquist, 1997, p. 1; Uyarra & Flanagan, 2010, p. 139; Yeow, Uyarra, & Gee, 2011, p. 2). Because the innovation partnership is specifically intended to strengthen the innovation chain, it is important that requirements such as this one, are facilitated in the set-up of the procurement process.

Both the limited experience of Dutch contracting authorities with the innovation partnership in the context of the built environment and the excitement and inherent difficulties to deviate from proven routines and methods, indicates the need for new insights. These insights should connect both (a) the intended potential possibilities of the innovation partnership and (b) the requirements that are set from innovation perspective to R&D processes, to (c) the practical worlds of the Dutch procurement authorities such that they can be applied in practice (Uyarra & Flanagan, 2010, p. 140). The European Commission explicitly emphasized this demand and published a sector independent guide for innovation procurement, which includes guidance for the application of the innovation partnership (European Commission, 2018, p. 9). The need for guidance for the application of the innovation partnership is also recognised by Hofmeijer, who conducted a study into the innovation partnership and provided a strategy for Dutch contracting authorities to optimise the usability of the procedure for accessibility-related 'mobility'- and 'infrastructure'-projects (2017, p. 15). However, Hofmeijer did *not* address the (methodological) question about how to practically apply the theoretical possibilities of the innovation partnership for construction-related innovation. This research aims [figure 5] to provide the required knowledge to bridge the gap between innovation partnership- and innovation management-related literature and the application of the procedure in the context of the built environment.

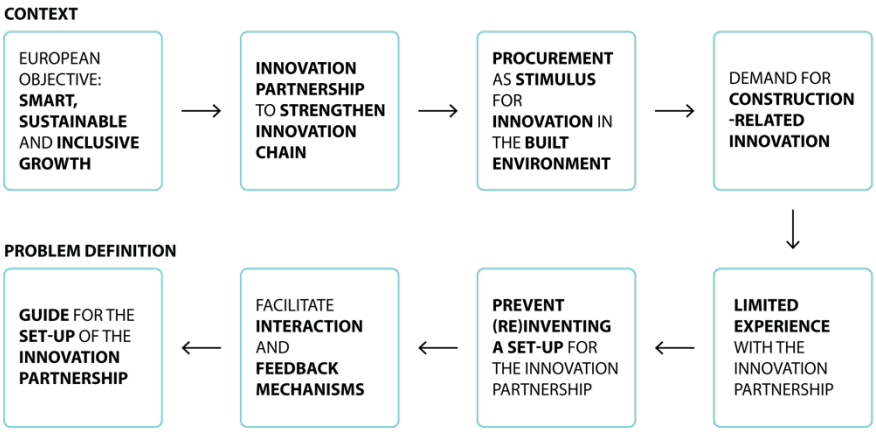


figure 5: context and problem definition

01.03 Research objective

Following the problem definition, the objective of this research is to:

> *Design a guide for project managers of Dutch contracting authorities with a demand for construction-related innovation to set up the innovation partnership, such that the right partner(s) can be selected for the development process towards the fulfilment of the contracting authority's ambition.*

01.04 Research question and sub-questions

The main research question, following the research objective, is:

> *How to set up the procurement procedure of the innovation partnership for contracting authorities with a demand for construction-related innovation, such that the right partner can be selected for the development process towards the fulfilment of the contracting authority's ambition?*

The sub-questions leading to the answering of the research question are:

1. What procedural parameters do innovation literature, European and Dutch procurement law and procurement practitioners distinguish for the set-up of the innovation partnership for use by Dutch contracting authorities with a demand for construction-related innovation?
    a. What are the legal characteristics of the innovation partnership?
    b. What legal aspects affect the set-up of the innovation partnership when it is used by Dutch contracting authorities with a demand for construction-related innovation?
    c. For what types of construction-related innovations can the innovation partnership be applied?
    d. What phases in the development process for a construction-related innovation can be identified?
2. What set-up of the procedural parameters of the innovation partnership facilitates an effective funnelling process that results in the selection of (a) suitable partner(s) for the fulfilment of the contracting authority's demand for construction-related innovation?

01.05 Scope definition

This research has the objective to assist project managers of contracting authorities in setting up the procurement procedure of the innovation partnership in the built environment. This research builds upon multiple bodies of knowledge: procurement law (and construction law), project procurement management and innovation management [figure 6] (Uyarra & Flanagan, 2010, p. 140). The scope in these bodies of knowledge, the definition of *construction-related demand* and clarification of the *project manager-perspective* are described below.

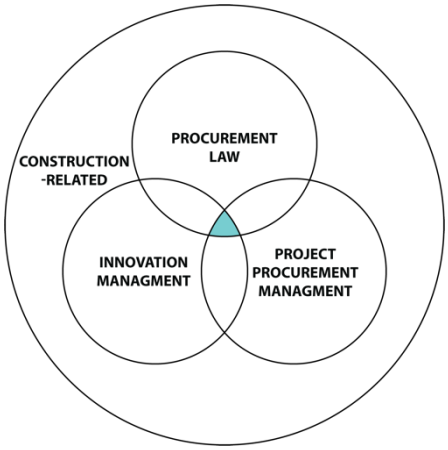


figure 6: scope definition

Construction-related
With construction-related is meant: related to "construction, alteration, repair, maintenance, extension, demolition or dismantling of buildings or structure forming or to form, part of the land (whether permanent or not)" (Bouwbesluit 2012, preamble; Housing Grants, Construction and Regeneration Act 1996, section 105 par 1).

Procurement law (and construction law)
Because the innovation partnership facilitates the innovation chain from research to commercialisation, the partner finding- and solution finding process overlap both the procurement- and the contracting phase[2]. Since the innovation partnership is a procurement procedure, the focus of the legal analysis is on:

- European and Dutch procurement legislation[3]: Directive 2014/24/EU; Dutch procurement law 2012 (2016) chapter 2; Proportionality Guide; ARW.
- Supporting legal literature: Essers (2017); Hebly (2017); Van Wijngaarden & Chao Duivis (2017) and PIANOo.

Innovation management
Innovation management includes managing creative *persons,* who participate in a creative *process.* This process takes place in a creative *environment* and facilitates the development of a creative *product*: the 'innovation' (Berkun, 2007, pp. 44–46; Buijs & Van der Meer, 2013, p. 1; Hekkert & Van

[2] This separation line between procurement law and construction law in the innovation partnership is discussed in chapter 03.
[3] Procurement involving procurement by entities operating in the water, energy, transport and postal services sectors and repealing (Directive 2014/25/EU and Dutch procurement law 2012 (2016) chapter 3), awarding of concession contracts (Directive 2014/23/EU and Dutch procurement law 2012 (2016) chapter 2a) and procurement on the coordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security (Directive 2009/81/EG) are out of scope of this research.

Dijk, 2011, p. 18; Hevner & Chatterjee, 2010, pp. 148, 149; Kuczmarski, 2003, p. 537; Lou, Chung, Dzan, & Shih, 2012, p. 1282; Rhodes, 1961; Sawyer, 2012, p. 11). Innovation management literature provides insights in how these aspects work together in innovation processes and this knowledge is used as additional input for the requirements of the set-up of the innovation partnership. Because the objective of this research is to design a guide to set up the procurement procedure of the innovation partnership, the focus is on the *process*, the *innovation* and the *persons* (tenderers) involved. The creative *environment* in which the innovation can be created, is considered conditional and is therefore out of scope of this research.

Project procurement management

Project procurement management is defined as: "the processes to purchase or acquire the products, services, or results needed from outside the project team to perform the work (Project Management Institute, 2008, p. 444)." In this definition, 'work' refers to the construction-related innovation and 'project team' refers to the individuals in the company of the contracting authority, led by a project manager.

Project manager-perspective

This research is written from the project manager-perspective. In the organisations of Dutch contracting authorities, project managers are the individuals responsible for the preparation-, procurement-, realisation- and evaluation phase of construction-related projects. Therefore, the guide resulting from this research, addresses actions these project managers need to take to set-up the innovation partnership.

In the set-up of the procurement process of the innovation partnership, the role of tenderers, advisors and lawyers is as important as the role of the contracting authority. All these groups have a role in the progress and the design of the procurement process. For that reason, also the interests of these three groups are included in verification and validation parts of this research. Their involvement indicates the relevancy of the outcomes of this research for as well Dutch contracting authorities as tenderers, advisors and lawyers.

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02 RESEARCH METHODOLOGY

02.01 Choice for research methodology

The objective of this research is to design a practical guide to assist project managers of contracting authorities to set up an innovation partnership. However, as was shown in the problem formulation, the problem faced by project managers is not trivial and this has been widely acknowledged in scientific literature (Edler et al., 2005, p. I, 9, 203; Edquist, 1997, p. 1; European Commission, 2018, p. 8; Hofmeijer, 2017, pp. 15, 16; Uyarra & Flanagan, 2010, pp. 139, 140; Yeow et al., 2011, p. 2). This research aims to use scientific knowledge from innovation management and project procurement management to help build this guide.

Because of the novelty of the innovation partnership and the limited practitioner experience with the practical applicability of the procedure, relatively little information exists that could help to identify requirements for the guide. Because of this lacking information and data, more explorative and development-based research methods are employed to design the guide. In research methodology literature, two scientific research methods were identified which seem able to deliver the required results. These research methods are action research and design research[4]. Both types of research are less extensively discussed in research methodology literature than the 'classical' hypothetical-deductive research methods (Creswell, 2009; Fellows & Liu, 2015, p. 23; Verschuren & Doorewaard, 2010, pp. 7, 8, 55, 56, 157). Nevertheless, action research has a significant research tradition.
Action research is characterised as a highly context dependent operationalised research approach which is designed to identify, implement and evaluate specific interventions which seek to realise specific organisational goals [such as a certain development or change] (Baskerville & Myers, 2004, pp. 329, 330; Cole, Purao, Rossi, & Sein, 2005, p. 326; Fellows & Liu, 2015, p. 23; Järvinen, 2007, pp. 37–42).
Design research is a relatively young research approach which made significant progress over the last decades. It consists of activities concerned with the creation, building, evaluation and improvement of social-technical artefacts (Cole et al., 2005, pp. 325, 326; Gregor & Hevner, 2013, p. 337; Hevner & Chatterjee, 2010, p. ix, 5; Järvinen, 2007, p. 37). Although both research methods are distinguished in research methodology literature, Cole et al. (2005, p. 325) reveal parallels and similarities between the two approaches. Järvinen (2007, p. 37) even argues that action research and design research can be considered to be overlapping and in fact might be considered as similar approaches. Hevner & Chatterjee (2010, p. 17) identify this similarity in the field study part of design research.
The main characteristic that distinguishes action research and design research from other research methods is that both methods investigate the phenomenon that emerges where the technological and the social system interact. They both aim to solve current practical problems while expanding scientific knowledge (Baskerville & Myers, 2004, pp. 329–331; Cole et al., 2005, p. 325; Hevner & Chatterjee, 2010, p. 6; Järvinen, 2007, pp. 41, 52). To conclude, both methods seem capable of providing a valuable contribution to the objective of this research. However, since time is limited and action research is more intensive and more time demanding, the design research methodology is selected as primary method the develop a first version of the guide.

It must be noted that the design research paradigm is generally associated with the development of socio-technical IT-related artefacts (Gregor & Hevner, 2013, p. 352; Hevner & Chatterjee, 2010, p. xiii; Iivari, 2007, pp. 2–4). Examples of these artefacts are concepts, constructs, models and methods (Cole et al., 2005, p. 326; Gregor & Hevner, 2013, p. 337; Hevner & Chatterjee, 2010, p. x, 6; Järvinen, 2007, p. 45). In this IT-context, design research is used to address so called 'wicked problems', "where social, technical, economic and political constraints interact and solutions cannot be deducted from scientific

[4] In literature also referred to as design science (Cole et al., 2005, p. 326; Iivari, 2007; Järvinen, 2007).

principles alone" (Baldwin in: Hevner & Chatterjee, 2010, p. xi)[5]. Despite the absence of the 'regular' IT-context, design research is considered a suitable method for this research for two reasons: First, the innovation challenges for the construction industry [§01.01] display organisational and managerial aspects which resemble features of 'wicked problems' that are similar to those in the IT-context. Furthermore, the integration interface of innovation management, procurement management and the built environment [§01.05] results in (potentially conflicting) social, technical, economic and political constraints (Balint, Stewart, Desai, & Walters, 2011, pp. 1, 2; Slaughter, 1998, p. 227; Whelton & Ballard, 2002, p. 11). And secondly, the explorative and development-based characteristics of design research matches the objective of this research: the development of a guide which is intended for practical use.

Limited practitioner experience with the innovation partnership and limited scientific literature about the procedure [§01.02] indicates a gap in our understanding of the complexity of the innovation partnership. This lack of understanding complicates the application of the design research methodology, which requires a deductive research approach based on scientific theories and methods as well as more inductive use of experience and expertise of practitioners (Hevner & Chatterjee, 2010, pp. 16, 18). Although part of the data can be retrieved through field testing (Hevner & Chatterjee, 2010, p. 18), another additional research method was required to obtain detailed and contextual understanding about the real-life dynamics in the Dutch construction industry regarding the innovation partnership. Only with detailed information about how and why the procedure should be applied in a certain manner, a suitable guide can be designed. To obtain this detailed and contextual data, an explorative research method is required. This explorative character was found in a qualitative research method (Boeije, 2005, pp. 18, 27, 35, 36, 54; Creswell, 2007, p. 40; Fellows & Liu, 2015, pp. 11, 23; Hevner & Chatterjee, 2010, p. 5; Verschuren & Doorewaard, 2010, p. 279). To conclude, this research is conducted through a mixed method research approach existing of qualitative research and design research. This mixed method approach facilitates to parallelly exploit (Creswell, 2009, p. 188) qualitative research's in-dept and contextual strengths and design research' creation, building, evaluation and improvement strengths.

To obtain empirical data, an open-ended, semi-structured interview approach was chosen. This approach was selected for three reasons: This approach facilitates the researcher to obtain similar structured data from each interviewee in a more explorative research. The semi-structured character provides guidance during the interviews, which in turn facilitates the interviewer to adjust and continue asking questions to retrieve in-depth information about a phenomenon. Additionally, the approach provides the possibility to build on previously obtained empirical information or advancing insights. (Boeije, 2005, pp. 35, 36, 57; Creswell, 2007, pp. 36–43; Fellows & Liu, 2015, p. 25; Flick, Kardorff, & Steinke, 2004, pp. 3, 4; Hammer & Wildavski, 1998, pp. 59, 60; Miller & Whicker, 1999, p. 167). An example of this possibility in the context of this research is the (verification of the) list of procedural aspects which affect the set-up of the innovation partnership. The steps and the content of the steps of the combined research method, are elaborated in the following sections.

[5] Hevner's (2010) research regarding 'wicked problems' is based on works of Rittel & Webber (1984) and Brooks (1987).

02.02 Steps in research methodology

The approach of this research consists of twelve more or less consecutive steps, within three iterative loops. As the research findings develop, the loops improve further. The relation between the steps of this research are presented in three flowcharts. figure 7 shows all the steps and their relations. figure 8 presents the steps of the literature review and the first matrix framework in more detail. And figure 9 describes how this review and the first matrix framework lead to an empirical grounded second matrix framework, guide and conclusions to the research question.

The twelve steps undertaken for this research are:

- Step 1: Determination of the context *[§01.01];*
- Step 2: Problem definition and research objective *[§01.02];*
- Step 3: First round of literature studies *[§02.03]*;
- Step 4: Design of the first matrix framework *[§02.04]*;
- Step 5: Interviews *[§02.05]*;
- Step 6: Second round of literature studies *[§02.03]*;
- Step 7: Design of the second matrix framework *[§02.06]*;
- Step 8: Verification and validation of the second matrix framework *[§02.07]*;
- Step 9: Design of the draft guide(s) *[§02.08]*;
- Step 10: Validation of the draft guide *[§02.09]*;
- Step 11: Design of the guide *[§02.10]*;
- Step 12: Conclusions, discussion and recommendations for further research *[§02.11]*.

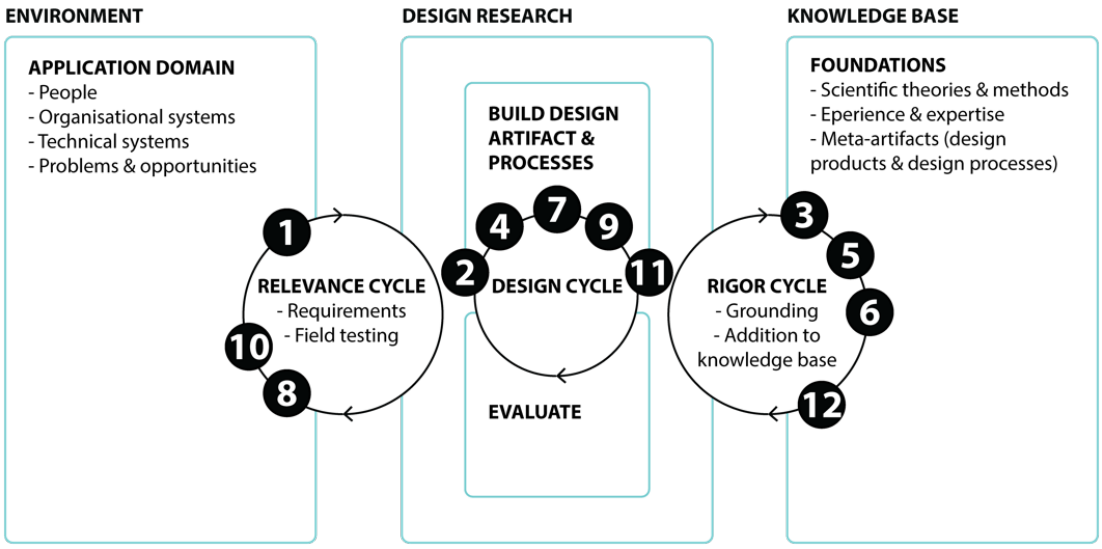

figure 7: indication of the steps of this research in Hevner's design research cycles

The results of steps 1 and 2 (determination of the context and problem definition and research objective) have been presented in §01.01, §01.02 and §01.03 and do not require further description. The method approach to the remaining ten steps are described in detail in the remainder of this chapter.

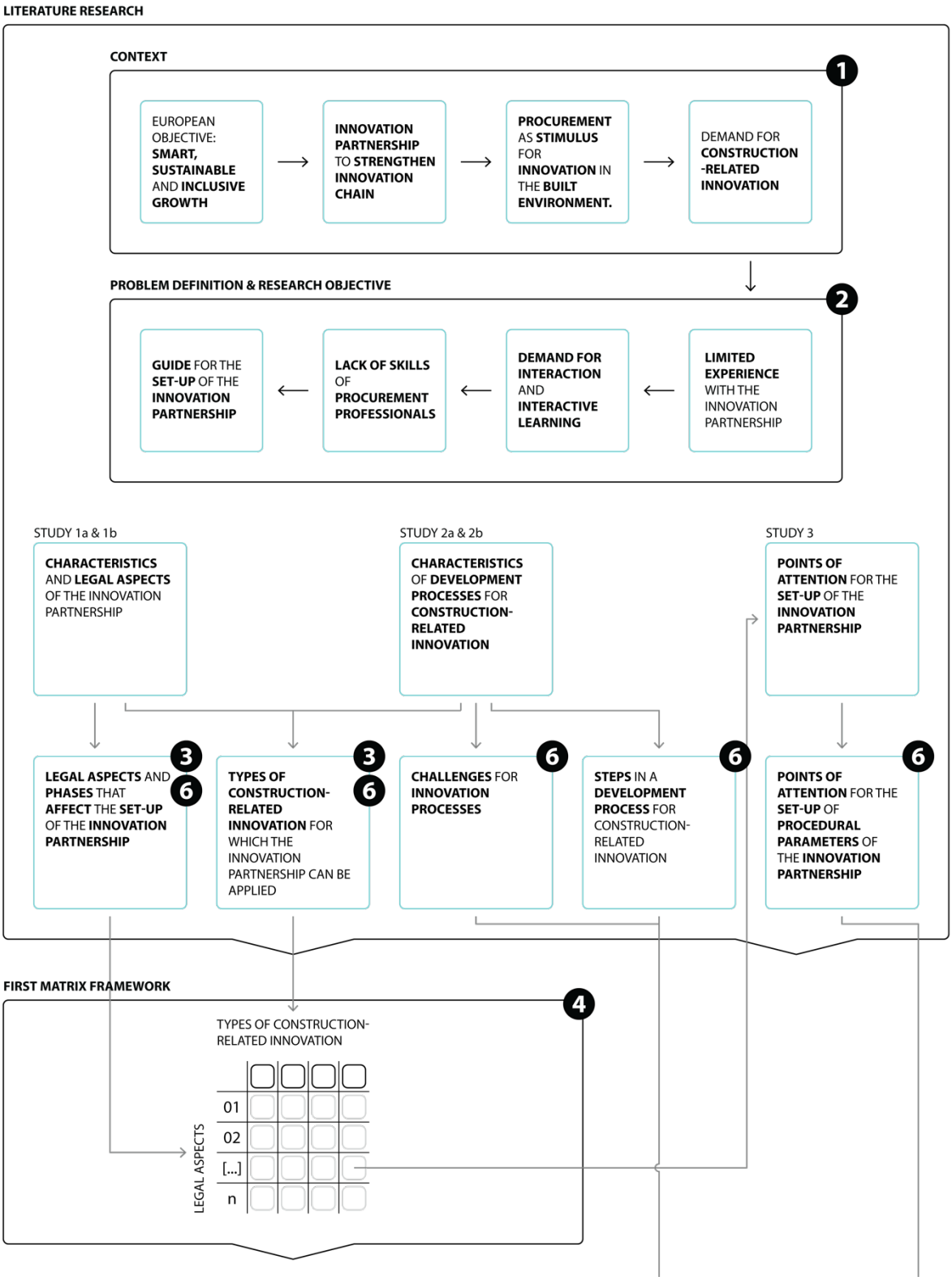

figure 8: methodology part 1 of 2

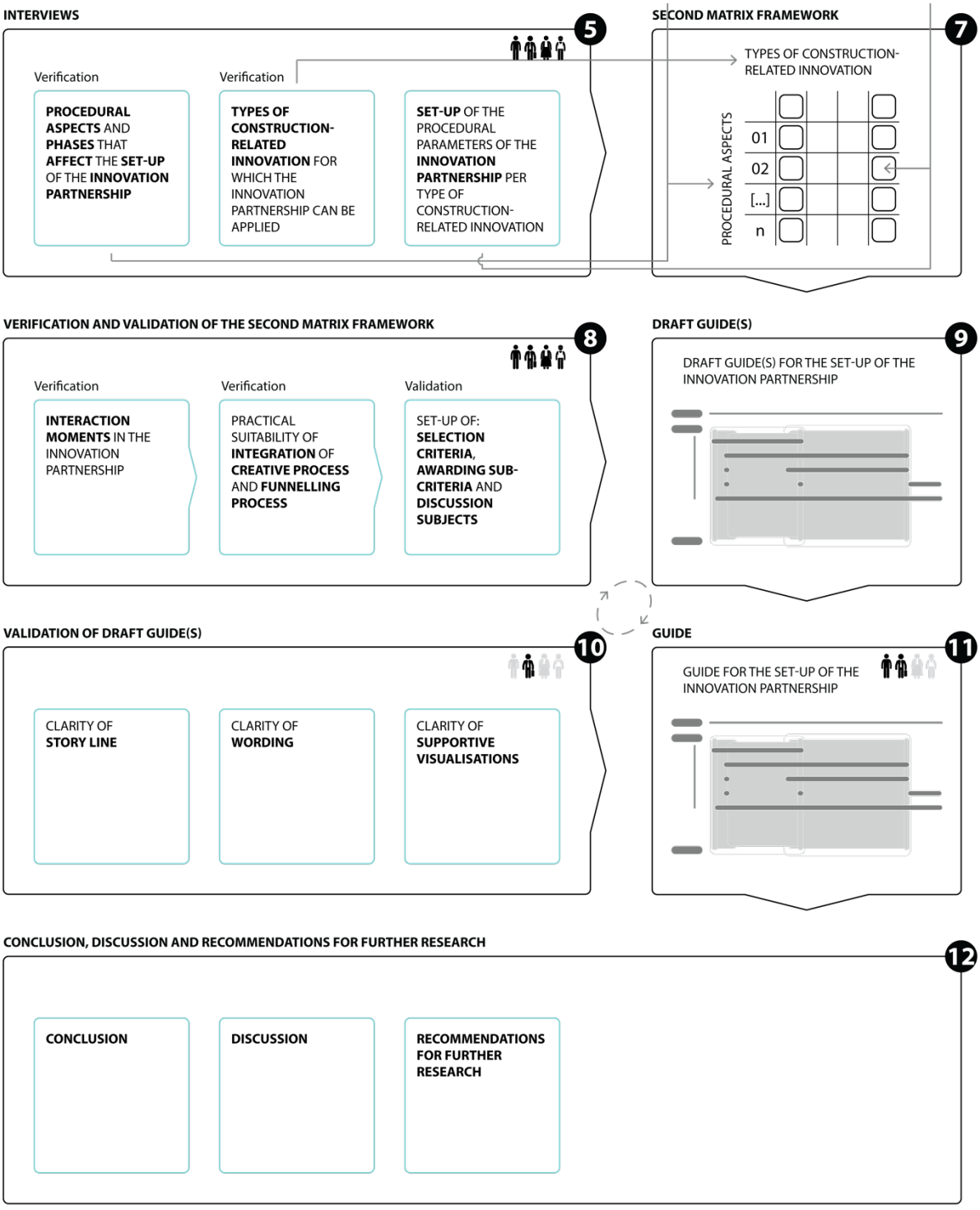

figure 9: methodology part 2 of 2

02.03 First and second round of literature studies

This research exists of two rounds of literature studies, displayed as step 3 and step 6 in the research methodology [figure 10]. Step 3 consists of studies 1a and 2a. Step 6 consists of studies 1b, 2b and 3. The two steps are described in more detail below. The first round of literature research was conducted to prepare interviews and start the interview process with scientifically grounded concepts. In this first round, the innovation partnership was decomposed into its smallest parts, to keep an overview of the set-up of the procurement process. A first matrix framework, further elaborated in §02.05, was developed to help interviewees to check all choices in the design of the process. The second round of literature research was conducted to find extra clarification for the data as found in practice. The first and second of literature existed of the following studies:

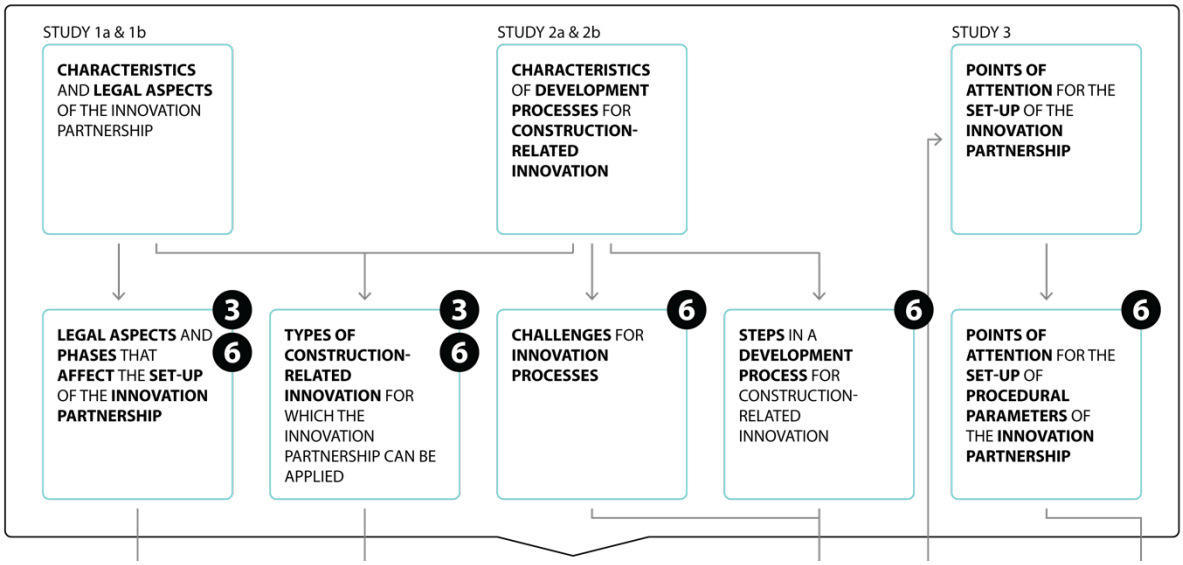

figure 10: literature studies

Step 3:

- *Study 1a:* A first study to identify characteristics and legal aspects of the innovation partnership. This study was conducted to keep an overview of the set-up of the procurement process. This study was done through literature research and analysis of European and Dutch procurement law and legal supporting literature. The initial selection of this literature was based on recommendations of the graduation committee. The product of this study provides a first indication of legal aspects (and phases) that affect the set-up of the innovation partnership. The product of this study is provided in chapter 03.
- *Study 2a:* A first study to identify and classify the types of innovation for which the innovation partnership can be applied. Because a development process which takes place during an innovation partnership by definition results into something which is not yet available on the market[6], it is hard to discuss the innovative result. To assess the impact of different types of innovation which could be required, a simple model was needed to allow respondents to talk about important characteristics of innovations. The various elements of the model were identified through literature research and analysis of procurement law, legal supporting literature and innovation management literature. Chapter 04 describes what model was used.

[6] "Een aanbestedende dienst kan de procedure van het innovatiepartnerschap toepassen voor een overheidsopdracht die is gericht op de ontwikkeling en aanschaf van een innovatief product of werk of een innovatieve dienst welke niet reeds op de markt beschikbaar is (Dutch procurement law 2012 (2016) Art 2.31a)."

The product of this study provides a first indication of different types of construction-related innovations for which the innovation partnership can be applied. The product of this study is provided in chapter 04.

These outcomes were used as input to establish the first matrix framework [§02.04, step 4]. Subsequently, this matrix framework was verified and improved by interviewees and served as basis to retrieve empirical data about the set-up of the procedural aspects of the innovation partnership per type of construction-related innovation [§02.05, step 5]. The conclusions retrieved from this data were used as input for a second round of literature review [step 6].

Step 6:

- *Study 1b:* Characteristics and legal aspects of the innovation partnership were again studied to interpret the data as found in practice. This supplemental study was conducted through literature research and analysis of European and Dutch procurement law and legal supporting literature. The selection of this supplemental literature was based on the data as provided in the interviews with practitioners.
- *Study 2b:*
  - A second study into the types of construction-related innovations for which the innovation partnership can be applied. This supplemental study sought for extra clarification for the data as found in practice. The study was conducted through literature research and analysis of European and Dutch procurement law. The selection of this supplemental literature was based on the types of innovation as indicated by practitioners [§06.01]. The product of this study can be found in chapter 07.
  - A study to identify challenges for innovation processes [§08.01]. This study was conducted through analysis of innovation management literature. The identified challenges were compared with the characteristics of the innovation partnership and placed in the context of the built environment.
  - A study to identify steps in a development process for construction-related innovations. This study resulted from previous research into challenges for innovation processes and was conducted through research into innovation management and creativity management literature[7]. The requirements for the development process, which are deducted from this literature are elaborated in chapter 08.
- *Study 3:* During the interview process of this research [step 5], empirical data about the set-up of the procedural aspects of the innovation partnership per type of construction-related innovation was deducted [§02.05]. This third study was done to find extra clarification for the data as found in practice. This supplementing and refining study was conducted through research into construction industry-based literature.

The second matrix framework [§02.04] was the result after the second round of literature studies. The set-up of the first matrix framework, the set-up of the interview process and the set-up of the second matrix framework are explained in the following sections.

02.04 First matrix framework

The first matrix framework [step 4] is the result of the integration of study 1a and 2a [§02.03, step 3]. It exists of a matrix [figure 11] indicating the procedural aspects that affect the set-up of the innovation partnership [vertical axis] per type of construction-related innovation [horizontal axis]. This particular

[7] "Creativity is the cause, and innovation is the effect (Buijs & Van der Meer, 2013, p. 1; Nyström, 1979)", as is further discussed in chapter 08.

set-up was chosen to provide interviewees an overview of the set-up of the innovation partnership and to check all choices which could be made in the design of the procurement process. The first matrix framework is depicted in chapter 05. In the following section is explained how this matrix was used to empirically identify a suitable set-up for the innovation partnership.

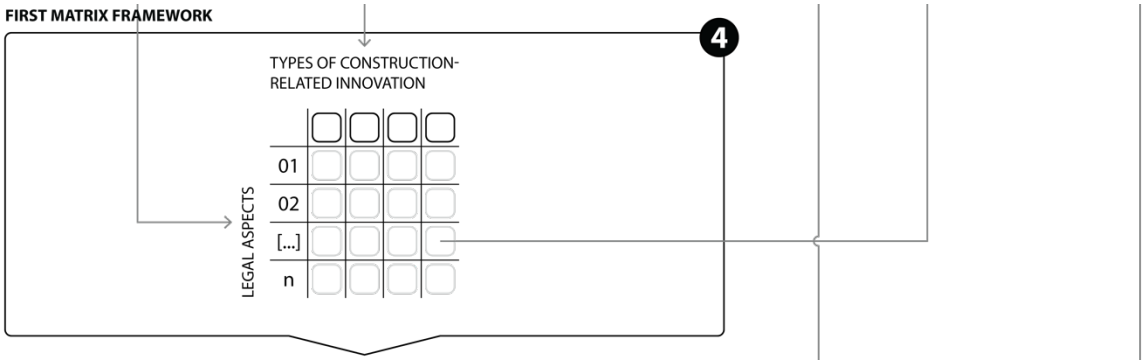

figure 11: first matrix framework

02.05 Interviews

The development of the first matrix framework was followed by the interview process. As argued [§02.01], an explorative open-ended, semi-structured interview approach was chosen to provide guidance during the interviews and to obtain similar structured data from each interviewee. The goal of the interview process was twofold:

- To verify, supplement and refine the first matrix framework, which was based on literature research.
- To identify the set-up of the procedural aspects of the innovation partnership per type of construction-related innovation.

In this section, the method of data gathering, the selection process of the interviewees and method for data analysis are elaborated.

02.05.01 Data gathering

The first objective of the interview process was to roughly verify the first matrix framework. This verification approach was chosen to identify and correct major and obvious errors in the framework (Creswell, 2007, p. 44; Creswell & Miller, 2000, p. 127; Morse, Barrett, Mayan, Olson, & Spiers, 2002, p. 17; Project Management Institute, 2008, p. 452) before they are designed incorrect into the guide. Verification, supplementation and refinement were achieved by the following two steps [figure 12]:

- Verification, supplementation and refinement of the list (and categorisation of phases) of (key) procedural parameters that affect the set-up of the innovation partnership, when the procedure is applied by Dutch contracting authorities with a demand for construction-related

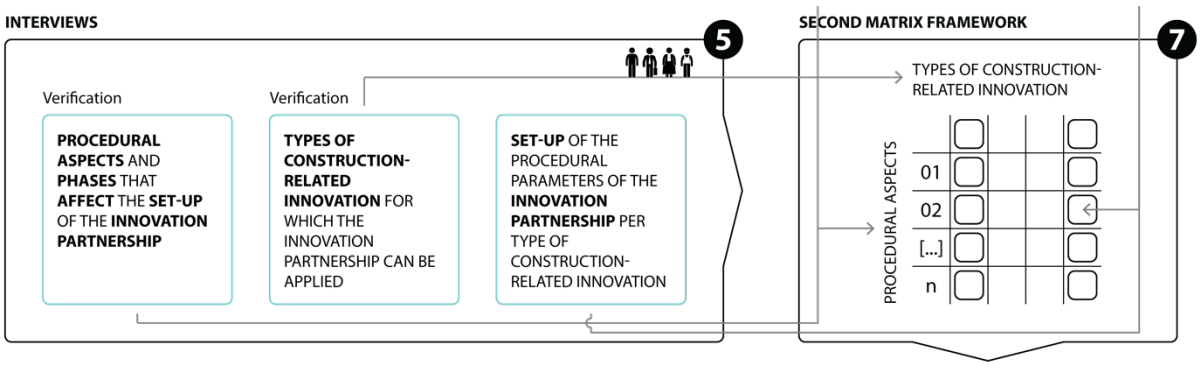

figure 12: interviews and second matrix framework

innovation. To retrieve this empirical data, a predefined list of procedural aspects was iteratively verified, supplemented and refined by the interviewees.

- Verification, supplementation and refinement of the types of construction-related innovations for which the innovation partnership can be applied. And identification of their influence on the set-up of the procedural aspects. To retrieve this empirical data, a predefined innovation-framework was used. Chapter 04 describes what model was chosen.

The second objective of the interview process was to identify suggested set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation. The first matrix framework was used to methodically discuss the choice options as perceived by the different interviewed practitioners.

02.05.02 Selection of interviewees

The interviews were conducted to obtain the different views and interests of representatives of groups who have an important role in the set-up of a procurement process: contracting authorities, tenderers, advisors and lawyers [§01.05]. To acquire sufficient variety in the responses per group, a minimum of five interviews per group was set. The interview process was stopped after twenty-six interviews [table 1] because the obtained data started to show similarities (Boeije, 2005, p. 52).

table 1: overview of group, function and number of interviewees

Group	Function	Number of interviewees
Contracting authority	Project manager	1
	Purchasing advisor	3
	Purchasers	3[a]
	Contract manager	1
	Innovation advisor	1
Advisor	Consultants	3
	Project-/ process managers	3[a]
	Innovation strategist	1[b]
	Business developer	1[b]
Lawyers	Lawyer	5
Contractors	Tender managers	3[c]
	Business developers	3[c]
Total interviewees		29
Total interviews		26

The selection of the interviewees[8] was based on the following reasoning:

- Twenty-one of the practitioners, who were willing to participate in the research, were recommended by the graduation committee members, based on their experience and expertise. The six individuals working for contracting authorities, four advisors, five lawyers and six contractors were selected because of their experience with construction-related projects in which either the procurement process or the procured result was considered innovative. Their suitability was verified through an internet search into their experience with this innovation (process). The outline of the interview was sent to the interviewees along with the request to participate in this research.

[8] Because of confidentiality agreements with the interviewees, their credentials are masked. However, the credentials are known to the graduation committee.

- In the Netherlands, there are multiple types of contracting authorities[9]. Representatives of two governmental agencies[10], three municipalities and two waterboards were found willing to participate in this research. Six of these interviewees were recommended by the graduation committee, as argued above. The other interviewees were selected because, during the time of research, they (had) announced their innovation partnerships-based project on TenderNed. These three interviews were held with the project managers/purchasers of the contracting authorities, who were responsible for the set-up of the innovation partnership.
- The four representatives of advising companies were supplemented with two additional advisors. The selection of these interviewees was based on theoretical sampling, a method which facilitates to slightly adjust the research direction during the interview process when considered necessary to achieve the design based objective of this research (Boeije, 2005, p. 51). Both advisors were selected because of their involvement in a partnership-based[11] development with innovative results.
- The lawyers were selected on their expertise and experience with procurement law and contracting law and their application in construction-related demands.

Three interviews took place with two interviewees. This pairing was considered legitimate because the objective of this research is to explore and not to identify absolute variation in the obtained data. The combinations, as suggested by the contacted interviewees, would gain access to additional and complementary experience and expertise of the introduced interviewees. The three interviews are indicated in table 1 with 'a', 'b' and 'c' in superscript.

02.05.03 Data analysis

The responses of the interviewees were recorded, transcribed and summarised. These summaries were sent back to the interviewees for verification to minimise possible misinterpretation. Subsequently, the data was manually scanned and transferred into theme-based documents. In these documents, the data of the individual interviewees [horizontal axis] was subdivided into categories such as: objectives, suggested set-ups, areas of concern, phases and rankings of procedural aspects [vertical axis]. Thereafter, this subdivided data was summarised, in which the differentiation of answers per resource group were sustained. The resulting data exists of the following six clusters, which are further elaborated in chapter 06:

- A verified, supplemented and refined list of types of construction-related innovations.
- A verified, supplemented and refined list (and categorisation of phases) of procedural aspects that affect the set-up of the innovation partnership, when the procedure is applied by Dutch contracting authorities with a demand for construction-related innovation.
- Verification of the proposed supportive visualisations[12].
- Identification of the procedural aspects which are considered key for a suitable set-up of the innovation partnership, when the procedure is applied by Dutch contracting authorities with a demand for construction-related innovation.
- Suggested set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation.

[9] Contracting authorities are: the state, regional or local authorities, a body governed by public law, or an association formed by one or more such authorities or one or more such bodies governed by public law (Directive 2014/24/EU Art 2 par 1; Dutch procurement law 2012 (2016) Art 1.1; Chao-Duivis, Koning, & Ubink, 2013, p. 137; Essers & Lombert, 2017, p. 15; PIANOo, 2017a). The characteristics of these contracting authorities are further elaborated in appendix 01.05.

[10] The two governmental agencies are: the 'Rijksvastgoedbedrijf' (RvB) and 'Rijkswaterstaat' (RWS). The RvB, is the Dutch Central Government Real Estate Agency (Rijksvastgoedbedrijf, 2018). And RWS "is responsible for the design, construction, management and maintenance of the main infrastructure facilities in the Netherlands (Rijkswaterstaat, 2018a)."

[11] With partnership is meant: a co-creation process with equal design influence for each partner. Note the difference between partnership-based development contract with innovative results and the procurement procedure of the innovation partnership.

[12] The design process of the supportive visualisations is described in §02.06.

- Identification of to what extent the types of demanded construction-related innovations influence the set-up of the procedural aspects.

02.06 Second matrix framework

The second matrix framework [figure 12, step 7] consists of the data as deducted from literature research [step 3 and step 6] and from practice [step 5]. With this combined data, the second matrix framework provides the basis for the guide. The matrix indicates which procedural aspects affect the set-up of the procedure [vertical axis] per type of construction-related innovation [horizontal axis]. The proposed set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation are enlisted in the cells. In each of these cells, the difference in answering of the four resource groups is indicated when dissimilarities were found.

02.07 Verification and validation of the second matrix framework

The third iteration cycle exists of two parts: a verification part and a validation part [figure 13]. This second verification round was chosen to identify and correct major and obvious errors (Creswell, 2007, p. 44; Creswell & Miller, 2000, p. 127; Morse et al., 2002, p. 17; Project Management Institute, 2008, p. 452) in the content of the second matrix framework, before they are built into the guide. The validation step (Creswell & Miller, 2000, pp. 124, 125; Hevner & Chatterjee, 2010, p. 140; Project Management Institute, 2008, p. 452) was undertaken to assure that the suggested set-up of the key determinants of the innovation partnership met the needs of the practitioners. In this section, the steps of these verification and validation parts and the selection process for the focus group are elaborated. The validation session was recorded, transcribed and summarised.

Verification of the second matrix framework

The verification part exists of two steps:

- Step 1: Verification of the identified interaction moments in the innovation partnership [§11.01]. To obtain this data, the interaction moments were presented to the focus group by means of a PowerPoint presentation. Subsequently, their oral feedback was included in the second verification step.
- Step 2: Having verified the interaction moments, the theoretical identified options for integration of the creative process and the funnelling process were discussed [§11.02]. This step was conducted to verify the practical suitability of the identified options for integration. To obtain this data, the identified options were presented to the focus group by means of a PowerPoint presentation. Subsequently, their oral feedback was included in the successive validation step.

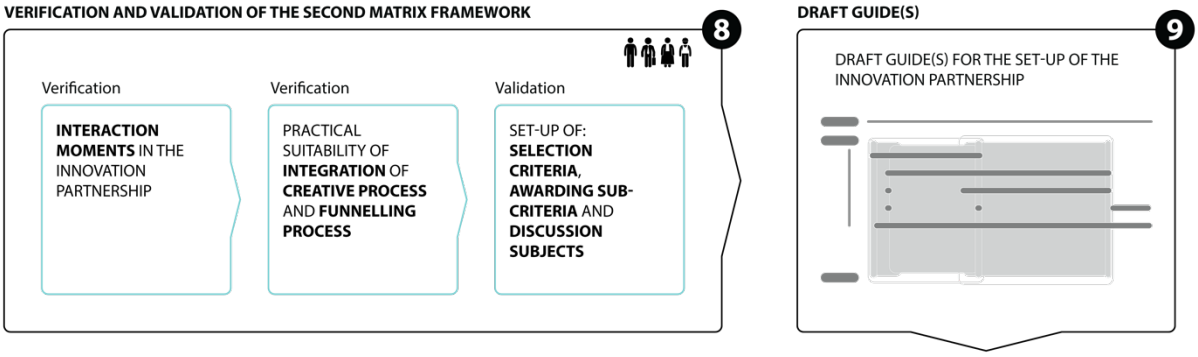

figure 13: verification and validation of second matrix framework and design of the draft guide(s)

Validation of the second matrix framework

The validation part of the second matrix framework is composed of a comparison of theoretical and empirical data [§11.03]. This comparative approach was chosen to both register the practitioners' individual responses and validate the interim outcomes of this research. The step included comparison of:

- The design of the key determinants for the set-up of the innovation partnership, as proposed by individual practitioners. The key determinants are: selection criteria, awarding sub-criteria and discussion subjects for the verified interaction moments. A hand-out was provided to the practitioners and they were asked to individually design and write down a set-up for these three procedural parameters [appendix 11].
- The selection criteria, awarding sub-criteria and discussion subjects, as included in the second matrix framework.

Selection of the focus group

The verification and validation were conducted by a focus group existing of four practitioners[13] [table 2]. The choice for these practitioners, was based on the following reasoning:

- A group of six to eight participants was considered "large enough to accommodate the different disciplines, ideas and opinions, yet small enough to keep a form of intimacy" (Tassoul, 2009, p. 133). It was estimated that all practitioners could through this form of intimacy, have a proportional share in the social dynamics of the discussion.
- As indicated in §02.05, mainly four groups of individuals are involved in procurement processes. To obtain a weighed reflection of the individual's visions and interests, a minimum of one and a maximum of two individual of each of these groups was set (Hevner & Chatterjee, 2010, pp. 122–127, 140). This maximum number of eight matches the indicated number as set by Tassoul (2009, p. 133).
- Because of the plenary character of the verification and validation session and the agendas of the contacted practitioners, it was difficult to assemble a focus group in which the four perspectives could be represented. Therefore, it was decided to settle with the participation of four individuals covering the four indicated perspectives and maintaining the required social dynamics.

table 2: overview of group, function and number of focus group members

Group	Function	Number
Contracting authority	(External) project manager, hired by the contracting authority	1
Advisor	Project management advisor	1
Lawyer	(Former) construction lawyer	1
Contractor	Tender manager	1
Total		4

The output resulting from the verification and validation session consists of the following three aspects:

- Verification of the (perceived) practical possibility of proposed integration options of the creative process and the funnelling process in the innovation partnership.
- Validation of the selection criteria, awarding sub-criteria and discussion subjects for the innovation partnership.
- Verification of the proposed supportive visualisations[14] in the second matrix framework.

[13] The credentials of the members of the focus group are confidential. However, their credentials are known to the graduation committee.
[14] The design process of the supportive visualisations is described in §02.08.

02.08 Draft guide(s)

The design process of the draft guide progressed in two parallel iterative processes:

- The design of the supportive visualisations.
- The development of the guide.

Design of the supportive visualisations

During the research process, multiple supportive visualisations of the innovation partnership were made. Especially in the period between July 2017 and September 2018, multiple design iterations took place. Two main design directions were chosen with respectively eight and three main versions and dozens of sub-versions. The design process of the visualisation proceeded as follows:

- Hofmeijer's (2017, pp. 39, 80–82) snake-like illustration of the innovation partnership was used as basis[15]. This illustration was chosen as basis because of its visual characteristics helped clarify the complex legal descriptions of the innovation partnership.
- However, four aspects required visual improvement. They were identified as important in the set-up of the innovation partnership, but were insufficiently shown in Hofmeijer's illustration. These visual improvements are:
    - The 'pre-procurement'-phase and the contracting/partnering-phase were added.
    - The visualisation of the funnelling process was actually illustrated as multiple funnels.
    - The addition of markings in the form of steps of the development process.
    - The addition of possible process set-ups to the legend.
- Interviewees, members of the focus group, members of the graduation panel and colleagues at Alba Concepts indicated that the visualisations of the first design direction were distracting and did not clarify the innovation partnership to the target audience. They indicated that a combination of a Gantt chart and flowchart could be more appropriate to visualise the procurement process.
- This second design direction underwent multiple design iterations, parallel to the design iterations of the draft guide(s).

Development of the guide

The verified and validated second matrix framework was developed into a draft guide. The design criterion for this guide was to make the guide as practical as possible. Practical in this context meant, aiming to convey concise yet understandable content and design options for practitioners [figure 13, step 9]. This development process started with the design of a first draft guide. In various design steps the guide was iteratively validated and further designed, based on the comments of practitioners. The steps of this validation process are described next.

02.09 Validation of the draft guide(s)

The validation of the draft guide was conducted to sharpen the practicality of the guide concerning the content of the guide (Hevner & Chatterjee, 2010, p. 140), clarification of the story line, the wording and the supportive visualisations. The iterations took place in the period June - September 2018 in eleven consecutive design iterations [appendix 07]. The timing of this last iteration is linked to the hand-in date of this graduation research. Nine of the iterations took place with individual practitioners. The guide was digitally and/or hard-copy provided to these individuals. Their comments were fed back in writing. After processing their feedback, the guide was sent to the next practitioner. Two iterations took place with a group of colleagues at Alba Concepts. The content of the guide was presented to the practitioners through a PowerPoint presentation. Their comments were plenary

[15] This was done with permission of the author (Hofmeijer, 2017).

discussed and the conclusions of this discussion were used as input for the design of the guide. The eleven validation sessions existed of two parallel trajectories:

- Validation to ensure the clarity of the creative process.
- Validation to ensure the clarity of the procurement process.

The criteria for the selection of the validating practitioners are elaborated below.

Selection of the validating practitioners

Two practitioners[16] were selected for the validation of the clarity of the creative process. These practitioners were selected on their practical and theoretical experience with innovation management and creative sessions [appendix 07]. For the validation of the feasibility of the procurement process, only advisors were selected. This group was chosen because advisors can adopt three viewpoints: they can act from the perspective of the contracting authority, the perspective of the contractor or they can act as independent process advising party. Moreover, because of their advising role, advisors generally experience a rapid flow trough of different clients. Therefore, especially advisors were considered to be able to provide weighed feedback from the different visions and interest of stakeholders in a construction project. An additional selection criterion was the ability of the practitioner to provide feedback within a couple of days. This criterion restricted the source area to the direct contacts of the researcher.

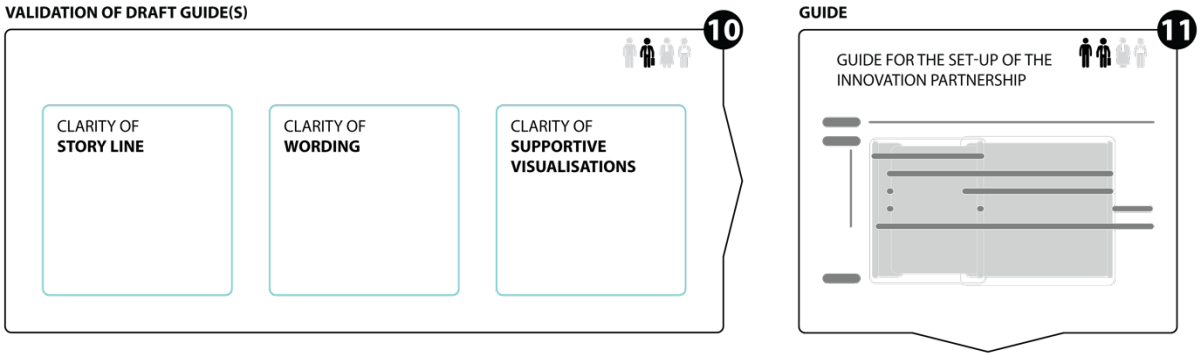

figure 14: validation of the draft guide(s) and design of the guide

02.10 The guide

The last design iteration in this research, results in a version of the guide which is ready for testing in practice. The guide [figure 14, step 11] includes the following content:

- A section about when to use the guide. This section was included to facilitate project managers to quickly determine the suitability of this guide for their demand.
- A reading guide for the guide. This section was included to provide a quick overview of the set-up of the guide.
- The theoretical guide, including information about:
  - The funnelling process in the innovation partnership.
  - The development process in the innovation partnership.

  This information was included because of the novelty of the innovation partnership. As indicated in the problem definition, there is the risk that project managers stick to their experience with frequently used and ingrained project approaches. Therefore, it is of major importance that the project managers really understand what choices they make in the set-up of the procedure. Otherwise there is the risk of them making choices based on assumptions and not fully utilizing the options procurement law and the innovation partnership provide.

[16] The credentials of the validating practitioners are confidential. However, their credentials are known to the graduation committee.

- The practical guide contains the description of actions for the five parallel processes in the innovation partnership:
    - Demand formulation;
    - Partner finding;
    - Solution finding;
    - Commercialisation;
    - Reflection.

  This sub-division was made to provide project managers an overview of the procurement process and to help them to check all choices in the design for the set-up the process.
- Supportive visualisations. These were included to provide project managers an overview of the procurement process.

In line with the research objective, this guide aims to support project managers of Dutch contracting authorities with a demand for construction-related innovation to set up the innovation partnership, such that the right partner(s) can be selected for the development process towards the fulfilment of the contracting authority's ambition [figure 14].

02.11 Conclusion, discussion and recommendations for further research

The conclusions of this research [chapter 13] provide answers to the sub-questions leading to the answering of the main research question [§01.04]. In chapter 14 the research results are discussed and recommendations for further research are made.

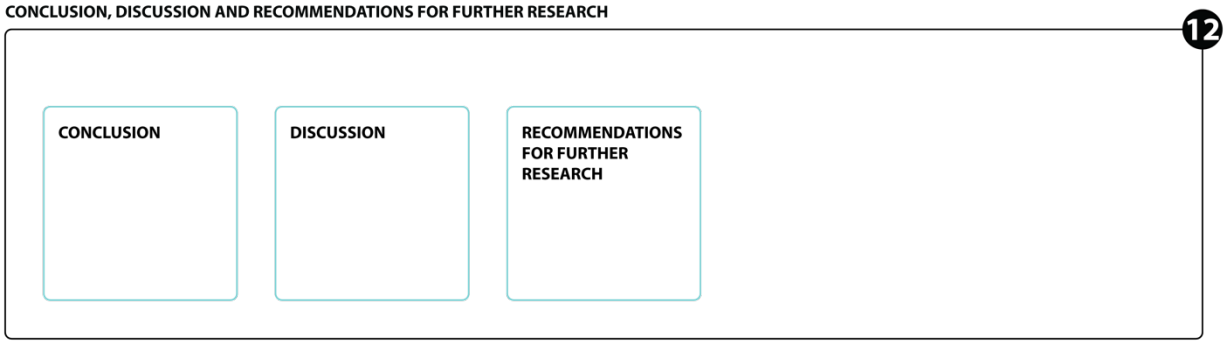

figure 15: conclusion, discussion and recommendations for further research

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03 INTRODUCTION TO THE INNOVATION PARTNERSHIP

Because of the recent introduction of the innovation partnership, practitioners have limited knowledge about- and experience with this procurement procedure [§01.02]. To overcome this information gap, the characteristics of the innovation partnership are discussed in this chapter. First a general overview of the procedural provisions is provided [§03.01] and thereafter the innovation partnership's key characteristics are thematically discussed. Lastly, the innovation partnership is disassembled into its smallest parts, with the objective to obtain an overview of the (key) influential factors that affect the set-up of the procedure [§03.02]. The articles of European and Dutch procurement law in which the innovation partnership is described, are included in appendix 02.

03.01 The innovation partnership

The innovation partnership was introduced by the European Commission to strengthen and integrate the innovation chain from research to commercialisation in a single procedure (European Commission, 2010, p. 10). Therewith, the procedure mandates development and subsequent large-scale purchase of resulting supplies, services or works which cannot be met by solutions already available on the market (Directive 2014/24/EU Art 31, Dutch procurement law 2012 (2016) Art 2.31a, §2.3.8.7a).
Analysis of European and Dutch procurement law and legal supporting literature shows that the procedural provisions indicate four important aspects:

- The innovation partnership facilitates to let the research and development process, take place before and after the awarding of the contract.
- The innovation partnership facilitates to award a contract to multiple parties.
- The innovation partnership facilitates to continue the funnelling process after the awarding of the contract.
- Application of the innovation partnership is not inherent to partnership-based contract terms.

These legal aspects are thematically discussed in the following sections. But first the legal definition of the development process requires elaboration to facilitate maximal understanding about the distinctive feature of the innovation partnership.

03.01.01 Research and development versus commercial development

As indicated in §03.01, the innovation partnership facilitates contracting authority to purchase a complete innovation process in a single procurement procedure. In European procurement law, this innovation process is divided in two consecutive definitions [figure 16]: research and development (R&D) and commercial development (Communication of the European Commission, 2007, p. 2, as referred to in Directive 2014/24/EU).

- Research and development: "can cover activities such as solution exploration and design, prototyping, up to the original development of a limited volume of a first product or services in the form of a test series […]. *"Original development of a product or service may include limited production or supply in order to incorporate the results of field testing and to demonstrate that the product or service to incorporate the results of field testing and to demonstrate that the product or service is suitable for production or supply in quantity to acceptable quality standards (WTO Agreement on Government Procurement, Art XV)."* (European Commission, 2007, p. 2)." Practically said, this face can be considered completed when there is proof of concept (Hofmeijer & Rasenberg, 2018, p. 21). Examples of these research and development projects in the context of the built environment are:
    - The glass bricks which were developed for Chanel's flagship store in the P.C. Hooftstraat in Amsterdam (TU Delft, 2018) [excluding its actual application].

    - Prêt-à-Loger: A sustainable renovation plan for row-houses, as developed by TU Delft students in 2014 (Prêt-à-Loger, 2017).
    - Or a current ongoing challenge: the development of building concepts which fully contribute to the principles of the circular economy (Alba Concepts, 2018).
- Commercial development enhances: *"quantity production, supply to establish commercial viability or to recover R&D costs, integration customisation, incremental adaptions and improvements to existing products or processes (European Commission, 2007, pp. 2, 3)."* Practically said, this commercial development starts when there is proof of concept. Examples of this commercial development in the context of the built environment are:
    - Wattlab's activities to integrate solar panels in various building components (WATTLAB, 2018).
    - The construction of a large residential area, based on a prototype such as Prêt-à-Loger or, in the nearby future, a house which is fully based on the principles of the circular economy.

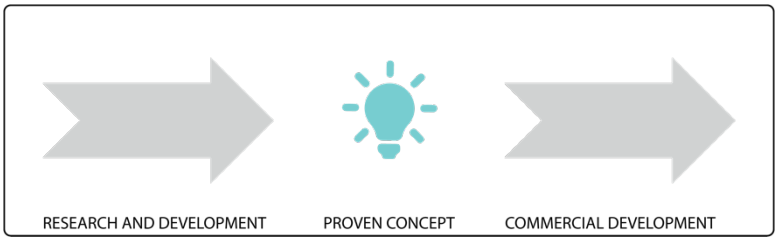

figure 16: research and development versus commercial development

03.01.02 Research, development and commercialisation in a single procedure

The distinctive characteristic of the innovation partnership is that it facilitates both (a) research and development into an innovative product, service or works and (b) the successive commercial purchase of the result in a single procedure [figure 16] (Directive 2014/24/EU preamble 49, Art 31; Dutch procurement law 2012 (2016) Art 2.31a, Art 2.126b par 8; PIANOo, 2016; Rijksoverheid, 2016b, pp. 16, 17). Before the amendment of the Dutch procurement law 2012 (2016), this research and development service and the subsequent commercial purchase of the result could only be procured via two separate procurement processes (Dutch procurement law 2012 (2016) Art 2.24g). Whether this coupling of R&D and commercial development has added value for one-off real-estate projects remains doubtful because of the procedure's current limited application [§01.02]. However, there are practical examples for which application of the innovation partnership is imaginable:

- In case of a large-scale housing project: use one house as a prototype, such as Prêt-à-Loger. Commercial upscaling [read: building more houses] can be applied after proof of concept.
- In case of a single building: use a small part of this building as a prototype. For example, a corner detail to show its disassembly performance. Or a façade detail to show the integration of a solar panel. Commercial upscaling [read: realisation of more of the same details] can be applied after proof of concept.

03.01.03 Development occurring before and/or after awarding of a contract

Analysis of the description of the innovation partnership, shows that the R&D activities of the procured demand can take place (both) *after*, and *before*, the awarding of a contract. This is shown by wording as "a long-term innovation partnership for the development and subsequent purchase of […]" (Directive 2014/24/EU preamble 49, Art 31 par 2) and "the innovation partnership can be applied

for assignments aimed at the development and purchase of an innovative product, work or service that is not already available on the market (Dutch procurement law 2012 (2016) Art 2.31a)"[17].

However, in literature there is discussion in which phase of the innovation partnership, the R&D activities should take place. Chao (2014, p. 228) discussed that wording as 'contracting authority', 'procurement documents', 'partnership' and 'partner' indicate ambiguity about the applicability of procurement law or contracting law during this R&D process. In the note following the amendment proposal of Dutch procurement law 2012 (2016), the Dutch minister of economic affairs elaborated that in the innovation partnership the R&D process takes place after the awarding of a contract (Rijksoverheid, 2016a, p. 10). Hofmeijer (2017, pp. 81–88) and Louwerse (2017, p. ii) indicate in their graduation research that R&D activities should occur before the awarding of a contract. In line with Dutch minister of economic affairs, the European Commission describes in its notice for guidance on innovation procurement: "The main feature of the innovation partnership is that the innovation occurs during the performance of the contract (European Commission, 2018, p. 45)." In their article about the innovation partnership in early practice, Hofmeijer & Rasenberg (2018, pp. 20, 22) imply that the R&D process takes place both during procurement and after the awarding of a contract.

In this same literature, the placement of the R&D activities is assigned to the characteristics of individual procurement procedures (Hofmeijer, 2017; Hofmeijer & Rasenberg, 2018; Louwerse, 2017; Wolswinkel, 2015). Explorative conversations with law practitioners and subsequent closer examination of procurement law and aforementioned literature indicates differently. It shows that the placement of the R&D activities says more about the chosen set-up of the procurement process than about the procurement procedure itself [note the difference between process and procedure]. This indicates that the description of procurement procedures in procurement law should not be considered exhaustive regarding the placing of R&D activities in procurement processes. The wording should be seen as stimulating expression of the possibilities which procurement law facilitates.

To conclude, Dutch procurement law does (and did) not restrict contracting authorities to facilitate R&D before or after the contract close. Unfortunately, this possibility is only seen by those who are not drowned in the complexity and comprehensiveness of procurement law. The limited recognition of this feature of procurement law can be explained by the, in the Dutch built environment frequently used, procurement set-ups in which the contract is signed when the exact characteristics of the solution are agreed [§01.02]. The innovation partnership is the first and only procurement procedure[18] in which is emphasized that R&D activities can take place after the awarding of a contract. However, as argued, the placement of the R&D activities mainly depends on the chosen set-up of the procurement process. This possibility could be made clearer in a next amendment of procurement law. For the innovation partnership in specific, the European legislator emphasizes to facilitate the development of the procured demand after the awarding of a contract.

[17] "Een aanbestedende dienst kan de procedure van het innovatiepartnerschap toepassen voor een overheidsopdracht die is gericht op de ontwikkeling en aanschaf van een innovatief product of werk of een innovatieve dienst welke niet reeds op de markt beschikbaar is (Dutch procurement law 2012 (2016) Art 2.31a)."

[18] It should be noted that this possibility to place R&D activities after the awarding of a contract, is described in the pre-commercial procurement approach (PCP), to which is referred in preamble 47 of Directive 2014/24/EU. Additionally, note that PCP is not one of the procurement procedures as defined in procurement law. In the Netherlands, PCP is also known as SBIR.

03.01.04 Awarding to multiple parties

The innovation partnership facilitates contracting authorities to "set up the innovation partnership with one partner or with several partners conducting separate research and development activities (Directive 2014/24/EU Art 31; AW 2.126d par 1)." This seems something new because traditionally, the contracting authority is looking for only one contractual partner. This is underlined by the use of words such as: 'most economically advantageous tender' [note the use of singular] (Directive 2014/24/EU Preamble par 89 and 92, Art 67. Before alteration of the Dutch procurement law 2012 (2016), the possibility to award to multiple parties was only explicitly mentioned in the framework agreement (Dutch procurement law 2012 (2016) Art 1.1; Art 2.142). This resulted in the impression that other types of procurement did not allow to award a contract to multiple parties. The innovation partnership is the only procedure in which the European and Dutch legislator disprove this assumption and explicitly allows contracting authorities to enter into a contract with more than one party.

Awarding to multiple parties in the context of the built environment might sound a bit odd. After all, in building projects there are generally seen limited plots available. The practicality of this option might become clearer when building on previous examples:

- In case of a large-scale housing project: assign a number of houses as a prototype, such as Prêt-à-Loger. Every contract partner can get a 'go' to develop multiple plots (commercial development), after proof of concept [see the go/no-go construction in §03.01.05].
- In case of a single building: use a small part of this building as a prototype. Examples are a corner- or a façade detail. Every contract partner can get a 'go' to develop the complete building (commercial development), after proof of concept.

This explicitly formulated option in the innovation partnership to award to multiple parties can be considered a positive stimulus to make procurement professionals aware that awarding to multiple parties is (and has been) facilitated by procurement law. It could be made clearer in a next amendment of procurement law that this possibility applies for every procurement process.

03.01.05 Funnelling before and after the awarding of a contract

The innovation partnership facilitates to progress the funnelling process after the awarding of a contract. This can be done with one or multiple contract partners [§03.01.04]. The enlengthening of the funnelling process can be facilitated through intermediate go/no-go moments during the development process (Directive 2014/24/EU Art 31 par 2; Dutch procurement law 2012 (2016) Art 1.1, Art 2.126d par 6). Before amendment of the Dutch procurement law 2012 (2016), no Article specifically prohibited this possibility to lengthen the funnelling process. However, the lengthening of the funnelling process seemed not necessary for the traditional procurement approaches [§01.02]. Practical examples for the application of this lengthened funnelling process are provided above. The innovation partnership can be considered a positive stimulus to make procurement professionals aware that lengthening the funnelling process is (and has been) facilitated by procurement law. This possibility could be made clearer in a next amendment of procurement law.

03.01.06 Partnership

The naming of the innovation partnership, arouses the appearance that some kind of partnership-based contract terms apply when using this procurement procedure. However, in European and Dutch procurement law, no reference is made to partnering terms rather than "intended partnering", "in

the context of partnership"[19] (Dutch procurement law 2012 (2016) Art 2.22, Art 2.126d par 5) and "with one partner or several partners (Directive 2014/24/EU, Art 31 par 1)". Also in legal supporting literature about the innovation partnership, these partnering-terms are not discussed. In his graduation thesis, Hofmeijer (2017, p. 86) writes about number of partners. Chao (2014, p. 228) and Louwerse (2017, p. 27) indicate that the partnership overlaps both the procurement process and the actual implementation of the intended innovation. And Hofmeijer and Rasenberg (2018, p. 20) mention that the innovation partnership is characterised by a form of partnership which differs from the traditional client/contract relation. Partnering is according to them more about collaborative development. As discussed in §03.01.03, the placement of the R&D activities mainly depends on the chosen set-up of the procurement process. The same applies for the application of partnership-based contracting: it depends on the chosen set-up for the execution of the assignment.
To conclude, the word 'partner' is rather misleading for practitioners who are in search for partnership-based procurement approaches. The innovation partnership is not equal to a partnership. The European and Dutch legislator seem to only encourage innovation processes based on partnering-term. However, the contracting authority and tenderers should collaborative make this partnering possible. This can also be done in combination with other procurement procedures than the innovation partnership.

03.02 Decomposition of the innovation partnership

The decomposition of the innovation partnership [table 3] is based on the description of the procedure as provided in European and Dutch procurement law (Directive 2014/24/EU Art 31; Dutch procurement law 2012 (2016) Art 1.1, Art 2.31a, §2.3.8.7a) and consists of 25 aspects divided in five categories.

table 3: a first decomposition of the innovation partnership

[#]	Legal aspect	Source
1. First selection		
1.1	Exclusion grounds	Directive Ar. 31 par 6; Dutch procurement law Art 2.31b step b;
1.2	Suitability criteria	Directive Art 31 par 6; Dutch procurement law Art 2.31b step c;
1.3	Selection criteria	Directive Art 31 par 6; Dutch procurement law Art 2.31b step d, Art 2.126b par 7 and 8;
1.4	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
2. Further selection		
2.1	Number of selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, Art 2.16b par 5;
2.2	Number of negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c par 1;
2.3	Number of candidates in selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, Art 2.16b par 5;
2.4	Number of candidates in negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c par 1;
2.5	Duration of selection phase	Directive art 31 par 2, par 7; Dutch procurement law art 2.31b step f, art 2126d par 4;
2.6	Duration of selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, art 2126d par 4;
2.7	Duration between negotiation rounds	Directive Art 31 par 3, par 4, Art 2126d par 4;

[19] "voorgenomen partnerschap" (Dutch procurement law 2012 (2016) Art 2.22) en "in het kader van het partnershap" (Dutch procurement law 2012 (2016) Art 2.126d, par 5).

2.8	Requested documentation in selection sub-phases	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126b;
2.9	Subjects for discussion in selection in negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c;
2.10	Number of information notices	Directive Art 31 par 2, par 3; Dutch procurement law Art 2.53;
2.11	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
3. Awarding		
3.1	Awarding criteria (best price-quality ratio)	Directive Art 31 par 1; Dutch procurement law Art 2.31b step g, Art 2.126b par 1;
3.2	Requested documentation for subscription	Directive Art 31 par 1; Dutch procurement law Art 2.126b;
3.3	Number of partners after awarding	Directive Art 31 par 1; Dutch procurement law Art 1.1, Art 2.126d;
3.4	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
3.5	Number of partners in commercial phase	Directive Art 31 par 1, par 2; Dutch procurement law Art 1.1, Art 2.126d;
4. Contracting		
4.1	Intellectual property	Directive Art 31 par 6; Dutch procurement law Art 2.31b step j, Art 2.126b par 6.
4.2	Reimbursement of transaction costs	Directive Art 31 par 2, par 7; Dutch procurement law Art 1.1, Art 2.126d par 3;
4.3	Contract form	Directive Art 31 par 1, 2; Dutch procurement law Art 2.31b step j;
4.4	Termination strategy	Directive Art 31 par 2; Directive Art 73; Dutch procurement law Art 2.126d par 6;
5. Commercialisation		
5.1	Profit distribution in commercial phase	Directive Art 31 par 2 par 7; Dutch procurement law Art 2.31b step j, Art 2.126d par 7;

How these 25 legal aspects should be set-up to facilitate an innovation process is elaborated in the following chapters. The first step towards that objective is to conduct a first investigation of types of innovation. These types of innovation are discussed in the next chapter.

04 A FIRST INVESTIGATION OF TYPES OF INNOVATION

The objective of this research is to design a guide for project managers of Dutch contracting authorities with a demand for construction-related innovation to set up the innovation partnership. The word 'innovation' in this objective can indicate many things and raises more questions than answers (Keeley, Pikkel, Quinn, & Walters, 2013, p. 22; Kuczmarski, 2003, p. 537). In the regulating legal context of the innovation partnership, ambiguity regarding the exact meaning of the word 'innovation', could trouble the usability of the procedure (Hofmeijer & Rasenberg, 2018, p. 23). Therefore, the term 'innovation' requires some more attention.

The innovation partnership facilitates R&D and large-scale purchase of something innovative in a single procurement procedure. In this chapter a first investigation is made of the appearance of this innovation. This investigation exists of two steps and according sections:

- Identification of the types of innovation, as defined in procurement law [§04.01].
- Identification of these types of innovation in literature [§04.02].

04.01 Types of innovation as defined in procurement law

The European and Dutch procurement laws each provide definitions of the 'innovation'-concept:

> *"'innovation' means the implementation of a new or significantly improved product, service or process, including but not limited to production, building or construction processes, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations inter alia with the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth (Directive 2014/24/EU Art 2 par 22)."*
>
> *"Innovation: the application of a new or significantly improved product, a new or significantly improved service or new or substantially improved process (Dutch procurement law 2012 (2016) Art 1.1)."*[20]

In these definitions, the distinction between 'new' and 'significantly improved' stands out. However, it remains ambiguous *when* something is 'new' or 'significantly improved'. To find out, literature was further investigated to classify the 'innovation'-concept.

04.02 Types of construction-related innovation as defined in literature

Henderson & Clark (1990) identify four types of innovation [figure 17] and indicate that these four types are developed in different ways. Slaughter (1998) continues the research of Henderson & Clark and underlines their findings for construction-related innovations. Moreover, she adds a fifth type of innovation: 'system innovation' [figure 18]. Both Slaughter and Henderson & Clark argue that there is a correlation between the type of organisation (such as managing, technical competent or conducting scientific research) and the resulting types of innovation which arise from a development process. Therefore, as they argue, the different types of innovation require different actions and innovation management approaches. This demand for different management approaches is underlined by Riggs & Von Hippel (1994, pp. 468, 469), Pries and Dorée (2005, pp. 562, 563) and Von Hippel & De Jong (2016, p. 3). Because the objective of the procurement procedure of the innovation partnership is to select a party which can develop a construction-related innovation, it can be assumed

[20] "*innovatie:* de toepassing van een nieuw of aanmerkelijk verbeterd product, een nieuwe of aanmerkelijk verbeterde dienst of een nieuw of aanmerkelijk verbeterd proces (Dutch procurement law 2012 (2016) Artikel 1.1)."

that there are different types of set-ups of the innovation partnership required to obtain different innovation objectives. Because no literature was found about the coupling of types innovation and the set-up of the innovation partnership, explorative interviews were conducted to obtain this data [§02.01].

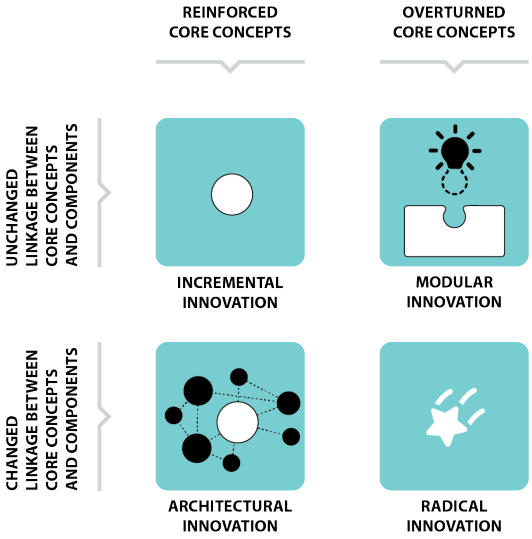

figure 17: Henderson & Clark's framework for defining innovation

A development process which takes place during an innovation partnership by definition results into something which is not yet available on the market[21]. Therefore, it is hard to discuss the innovative result. A simple model can help procurement professionals to identify different important characteristics of innovations and to assess the requirements of the different types of innovation for the R&D and commercial development process in the innovation partnership. Which model is best suitable to reach this objective, is discussed next.

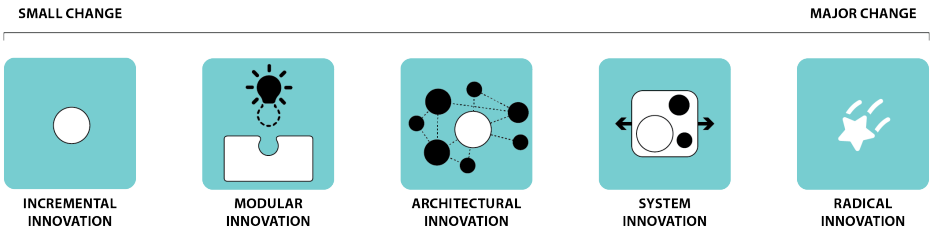

figure 18: Slaughter's framework for defining innovation

04.03 Choice for innovation model

As visualised in figure 17 and figure 18, the model of Henderson & Clark has two axis and the model of Slaughter has one axis. Because of the unambiguous division of the model Henderson & Clark, it is

[21] "Een aanbestedende dienst kan de procedure van het innovatiepartnerschap toepassen voor een overheidsopdracht die is gericht op de ontwikkeling en aanschaf van een innovatief product of werk of een innovatieve dienst welke niet reeds op de markt beschikbaar is (Dutch procurement law 2012 (2016) Art 2.31a)."

assumed easier to discuss about than the three in-between levels of Slaughter. Therefore, of the two shown models, this model was chosen as scientific grounding for the interview process.

The extremes in the model of Henderson & Clark are incremental and radical innovation. This gradation matches the distinction between ‘significantly improved’ and ‘new’ as identified in the definition of innovation in procurement law. Therefore, it is estimated that there will be a difference in the set-up of the innovation partnership when it is used for these types of innovation. Whether ‘modular innovation’ and ‘architectural innovation’ also have a significant influence on the set-up of the procedure, will have to appear from explorative empirical research.

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05 FIRST MATRIX FRAMEWORK

The first framework [table 4] is a matrix which integrates the procedural aspects that affect the set-up of the innovation partnership [vertical axis], as identified in chapter 03, with the types of construction-related innovations [horizontal axis] from chapter 04.

table 4: first matrix framework

[#]	Legal aspect	Types of innovation			
		Incremental innovation	**Modular innovation**	**Architectural innovation**	**Radical innovation**
1. First selection					
1.1	Exclusion grounds				
1.2	Suitability criteria				
1.3	Selection criteria				
1.4	Objection term				
2. Further selection					
2.1	Number of selection sub-phases				
2.2	Number of negotiation rounds				
2.3	Number of candidates in selection sub-phases				
2.4	Number of candidates in negotiation rounds				
2.5	Duration of selection phase				
2.6	Duration of selection sub-phases				
2.7	Duration between negotiation rounds				
2.8	Requested documentation in selection sub-phases				
2.9	Subjects for discussion in selection in negotiation rounds				
2.10	Number of information notices				
2.11	Objection term				
3. Awarding phase					
3.1	Awarding criteria (best price-quality ratio)				
3.2	Requested documentation for subscription				
3.3	Number of partners after awarding				
3.4	Objection term				
3.5	Number of partners in commercial phase				
4. Contracting					
4.1	Intellectual property				
4.2	Reimbursement of transaction costs				
4.3	Contract form				
4.4	Termination strategy				
5. Commercialisation					
5.1	Profit distribution in commercial phase				

In the next chapter this matrix framework is verified, supplemented and refined through twenty-six stakeholder interviews. Moreover, as a subsequent step in the completion of the matrix framework, proposed set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation are identified [the cells in table 4].

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06 INTERVIEWS

Limited practitioner experience with the innovation partnership and limited scientific literature about the procedure, indicates a gap in our understanding of the complexity of the innovation partnership. An open-ended semi-structured interview approach was chosen to obtain detailed and contextual understanding about the real-life dynamics in the Dutch construction industry regarding the innovation partnership. The results of the interview process supported the development of the second matrix framework. This support is structured in the following three contributions and according sections:

- Verification, supplementation and refinement of the types of construction-related innovations and identification of their influence on the set-up of the procedural aspects of the innovation partnership [§06.01].
- Verification, supplementation and refinement of the list (and categorisation of phases) of (key) procedural parameters that affect the set-up of the innovation partnership, when the procedure is applied by Dutch contracting authorities with a demand for construction-related innovation [§06.02].
- Identification of suggested set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation [§06.03].

A summary of the data and the implications for this research are elaborated below.

06.01 Types of construction-related innovation

To assess the impact of different types of innovation which could be required for the design of the guide, Henderson and Clark's innovation classification was chosen to allow interviewees to talk about different important characteristics of innovations [chapter 04]. The interviews provided the following results[22]:

- Construction-related innovation can be categorised in a variety of ways:
    - Based on its *objectives*: social, financial, ecological, etc.
    - Based on the used *means*: method, financial structure, process, material, technology, etc.
    - Based on the [sub-]*phases* in the innovation process: preparation, sketching, prototyping, testing, realisation, etc.
    - Based on the *result*: process, product, method, technology, material, service etc.
    - Based on its *degree of change*: minor, major or new.
    - Based on the *perspective*: individual, company, etc.

- The distinction between incremental-, modular-, architectural- and radical innovation, was perceived too complex for application in practice. The inapplicability is based on the procurement practitioner's lack of experience in recognising and distinguishing the different types innovation. Moreover, they *recognise* this four-part division not as necessary or of influence on their choices and or actions in the procurement process.

- However, the respondents expect the distinction between minor changes (incremental innovation) and the development of something new (radical innovation) to influence:
    - The description of the challenge;
    - The recommended number of (cross-over) parties in the funnelling process;
    - The timing of discussion about sketches and prototypes;

[22] No significant difference between the answering of stakeholder groups was identified. Therefore, difference in answering of stakeholder groups was not indicated.

- The correlating set-up of the funnelling criteria.

This is further discussed in §06.03.03.

These results were used as input for a second round of literature studies [chapter 07] and subsequently as basis for the design of the second matrix framework [chapter 10].

06.02 Procedural aspects that affect the set-up of the innovation partnership

In chapter 03 a decomposition of the innovation partnership was made to enlist the legal aspects that affect the set-up of the procedure. This list was drawn up based on literature research and formed the starting point of the first matrix framework. The list was subsequently iteratively verified, supplemented and refined per consecutive interview with the practitioners. The resulting list with the (key) procedural aspects is depicted below [table 5]. Aspects marked with an * were added to the list. Aspects marked with ** were relocated. No aspects were removed from the list.

table 5: procedural aspects that affect the set-up of the innovation partnership

[#]	Procedural aspect
0. Pre-procurement *	
0.1	Challenge formulation *
0.2	Market consultation *
1. First selection	
1.1	Exclusion grounds
1.2	Suitability criteria
1.3	Selection criteria
1.4	Objection term
2. Process design and further selection	
2.1	Number of selection sub-phases
2.2	Number of negotiation rounds
2.3	Number of candidates in selection sub-phases
2.4	Number of candidates in negotiation rounds
2.5	Duration of selection phase
2.6	Duration of selection sub-phases
2.7	Duration between negotiation rounds
2.8	Requested documentation in selection sub-phases
2.9	Subjects for discussion in selection in negotiation rounds
2.10	Number of information notices
2.11	Objection term
2.12	Reimbursement of transaction costs **
3. Awarding phase	
3.1	Awarding sub-criteria under awarding criterion: best price-quality ratio
3.2	Requested documentation for subscription
3.3	Number of partners after awarding
3.4	Objection term
4. Contracting	
4.1	Intellectual property
4.2	Confidentiality agreement *
4.3	Contract form
4.4	Incentives (bonus/malus) *
4.5	Contract duration *
4.6	Contract termination strategy (go/no-go moments)
5. Commercialisation	
5.1	Number of partners in commercial phase **
5.2	Profit distribution in commercial phase
6. Evaluation and publication	

These (key) procedural aspects were incorporated in an updated version of the matrix framework which in turn was used to identify the set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation. These identified set-ups are discussed in the next sub-section.

06.03 Suggested set-up of the procedural aspects that affect the set-up of the innovation partnership

The interviewees were asked to set-up the procedural aspects of the matrix framework per type of construction-related innovation. Their response regarding this set-up is categorised in three parts and according sections:

- General interpretation of the characteristics of the innovation partnership [§06.03.01];
- General suggestions for the set-up of the innovation partnership [§06.03.02];
- Suggestions for set-up of procedural aspects of the innovation partnership per type of construction-related innovation [§06.03.03].

06.03.01 General interpretation of the characteristics of the innovation partnership

Preliminary to the interviews, literature research was conducted, explorative meetings were attended and explorative conversations were held to obtain understanding about the characteristics of the innovation partnership [appendix 07]. Resulting therefrom, the following four characteristics of the innovation partnership were used as starting point for the interview process:

- The innovation partnership can be used for purchasing something ‘new’ or ‘significantly improved’ which is not yet available on the market;
- The innovation partnership *enables* the development of the procured demand after, rather than before, the awarding of a contract;
- The innovation partnership *enables* awarding to multiple parties;
- The innovation partnership *enables* to let the funnelling process of (possible) development partners progress from the procurement-phase into the contract/partnering-phase.

Based on this input, the interviewees voiced their interpretation of the innovation partnership. These interpretations are summarized as follows:

- The innovation partnership is mainly perceived as a procurement set-up approach, rather than a procurement procedure. This is caused by the coupling of the words: ‘innovation’ and ‘partnership’, in the naming of the procedure.
- The innovation partnership is perceived as more flexible than the *perceived restrictive legal characteristics* of other procurement procedures. The is perception is based on the perceived increased contractual freedom:
    - Solution directions can and must be less detailed specified at the start of the procurement process because the demanded ‘new’ or ‘significantly improved’ product service or work is not yet available on the market;
    - Go/no-go moments could be applied during the procurement-phase and the contract/partnering-phase.
- Interviewed lawyers described the main distinctive characteristic of the procedure: the innovation partnership mandates the development and subsequent large-scale purchase of something ‘new’ or ‘significantly improved’ *in a single procedure*.

Confirmed added value of this research

The attentive reader could have noticed the difference of the wording in above stated list of characteristics of the innovation partnership, and the list of characteristics as described in chapter 03. The mistaken word *‘enabled’* should have been replaced by the actual correct wording *‘emphasizes*

the possibility to facilitate'. This essential difference in wording is an advancing insight[23] which became clear after the interview process took place. This difference of practitioner's interpretation between the actual and the perceived distinctive characteristics of the innovation partnership confirms the added value of this research.

To summarise:
In the description of the innovation partnership in procurement law, three features procurement law facilitates are emphasized [§03.01]:

- The development of the procured demand can take place after awarding of a contract.
- Awarding a contract to multiple parties is possible.
- Funnelling criteria (go/no-go moments) can be used after the awarding of a contract.

These three features of procurement law are unfairly considered to be the distinctive characteristics of the innovation partnership. The actual distinctive characteristic of the innovation partnership is that the procedure mandates research, development and commercial purchase of something 'new' or 'significantly improved' *in a single procurement procedure*.

06.03.02 General suggestions for the set-up of the innovation partnership

In the previous section was stated that the innovation partnership is perceived as a procurement set-up approach, rather than a procurement procedure. This is caused by the coupling of the words: 'innovation' and 'partnership', in the naming of the procedure. Stakeholders voiced three suggestions for the set-up of a partnership:

- Objectives should be shared.
- Costs and benefits should be shared: This sharing is considered to have a positive effect on the financial feasibility of the development process.
- There should be an interaction-match between the contracting authority and its development partner because a high level of interaction/dialogue is demand.

In line with this advice, stakeholders voiced three additional suggestions for the set-up of an innovation-focussed partnership:

- The objective of an innovation process should not be to innovate, it should be to facilitate the solution finding process for a stated demand.
- Physical prototyping space should be provided.
- The procurement process should be as short as possible, but as long as necessary.

In the next sub-section, stakeholders' suggestions for set-up of procedural aspects of the innovation partnership per type of construction-related innovation are described.

[23] Note that the content of chapter 03.01 is based on the actual correct data. Although the iterative methodology of this research would plead to include this information in the second matrix framework, the chosen set-up of this report was estimated to be of added value for its readability.

06.03.03 Considerations and suggestions for the set-up of procedural aspects of the innovation partnership per type of construction-related innovation

Practitioners' considerations and suggestions for the set-up of the procedural aspects of the innovation partnership are categorized in five categories which are listed below. In this data, the difference in answering of the four resource groups is indicated when dissimilarities were found.
The same applies to differences in considerations and suggestions for the development of something 'new' or 'significantly improved': it is only indicated when set-up preferences should be distinguished.
The suggested subjects for discussion and funnelling criteria were shortlisted. The complete lists can be found in appendix 10.

0. Pre-procurement

Challenge formulation

- Procuring parties should find the essence of their demand to enable maximum solution space for the tenderer's development process. This can be accomplished by defining the ambition, the objective and performance criteria, rather than functional or technical specifications. The broader the solution space, the higher the possible diversification of solutions.
- The demand formulation for the development of something 'significantly improved' should include more specified information about a solution direction than the demand formulation for the development of something 'new'.

Market consultation

- Facilitate questioning of the formulated challenge.
- Involve as many parties as possible: The call for participation in a market consultation for the development of something 'new' or 'significantly improved' should be published on TenderNed.nl, ted.europe.eu and beyond (Facebook, Twitter, LinkedIn) to reach maximum publicity.
- Subjects for discussion during a market consultation are:
    - The design of the funnelling process;
    - The development process;
    - Optional solution directions;
    - The business case and contract terms;

1. Funnelling process

General

- Parties with less employees are perceived to be more innovative than parties with more employees;
- Consortium forming between these smaller and bigger parties can help to form teams with all demanded qualities: creative quality, technological quality, management quality, financial quality, system integration quality, …
- The influence of the smaller parties in consortia should be secured;
- Innovation space for parties further down the supply chain should be secured [sub-contractors, sub-sub-contractors].

Number of candidates / tenderers / partners per funnelling round

- The chance to get the contract awarded should be proportionate to the reimbursement level of tendering costs;
- The higher the number of development partners, the higher the chance of similar solution directions for the procured demand;

- The lower the number of development partners, the higher the chance of a vendor-lock-in.
- The higher the specification level of the procured demand, the less diversification of solution directions is demanded to explore suitable answers for the procured demand. This means that the number[24] of optional development partners for the development of something 'significantly improved' can be lower than for the development of something 'new'.
- The advised number of candidates / tenderers / partners per funnelling round is enlisted in table 6:

table 6: number of candidates / tenderers per funnelling round

Funnelling round	Number of candidates / tenderers
Subscription	N
Pre-selection round ▪ Exclusion grounds	N>X
Optional: further selection round(s) ▪ Suitability requirements ▪ Selection criteria	X>5 X>3
Awarding	1, 2, 3

Exclusion grounds

- Mandatory and facultative exclusion grounds are prescribed by procurement law. The added value of the application and the set-up of the facultative exclusion grounds should be critically reviewed in perspective of the challenge formulation.

Suitability criteria

- Criteria regarding the professional ability of projects performed in the past could not be of added value in the context of the development of something 'new' or 'significantly improved'.
- Optional innovation stimulating partners (crossovers, start-ups, artists, etc.) might be unintentionally excluded from participation in the procurement process because of the level of the suitability requirements.

Selection criteria

Select on:

- General knowledgeability and expertise of (individual employees of) the company. Especially regarding:
  - Interaction-match;
  - Innovation potential.
- Effectiveness of used plan of action of projects performed in the past.
- General vision on themes of the challenge.

Awarding sub-criteria

- Awarding on solely qualitative aspects can be facilitated when working with a fixed price.
- *Contractors* and *advisors* focused on awarding sub-criteria as:
  - General knowledgeability and expertise of (individual employees of) the company. Especially regarding:
    - Interaction-match;
    - Innovation potential.
- *Contracting authorities* and *lawyers* focused on awarding sub-criteria as:
  - Solution direction (vision, concept, sketch, prototype, performance).
  - Plan of action for the 'solution finding'-process.

[24] Assuming that the number of solution directions is equal to the number of optional development partners.

Go/no-go moments

Go/no-go moments could be based on:

- The level of the design: from 'sketch' up to 'prototype';
- The performance of a prototype.

Objection term

- The legal minimum length of the objection term can be shortened when mutually agreed upon between procuring parties and tenderers. Lengthening is always a possibility. The guidelines should be that parties should have the time to discuss the matter.
- The duration of the objection term can withdrawal the dynamics out of the process.
- The tendency to state objection correlates with the tenderers feeling of honest treatment regarding decision making and reimbursement of tendering costs.

2. Solution finding process

Notes of information

- There is no limit for the number of notes of information.
- Distinction should be made between general notes of information and confidential notes of information.

Negotiation rounds[25]

- Creativity stimulating interaction is more important for the development of something 'new' or 'significantly improved than for procurement of known solution directions.
- Subjects for discussion during these interaction moments are:
    - The process design of the development process;
    - The [re-]framing of the problem;
    - The business case and the contract terms;
    - Social aspects of collaboration and interaction;
    - Team composition;
    - Solution direction.

3. Contracting

- The contract should be (partly) set-up in consultation between the contracting authority and its development partners.
- Alliance[26] contracting is deemed best suitable for partnering.
- Every project will be assessed on its financial feasibility. Consequently, the feasibility of the business case is the most important corner stone for the innovation process. Business case aspects which need to be discussed are:
    - Cost and benefit sharing/division during procurement;
    - Cost and benefit sharing/division during contracting/partnering;
    - Cost and benefit sharing/division in de commercial phase;
    - Intellectual property;
    - Arrangement per go/no-go moment.

Intellectual property

- In a creative process, the process results are property of all participating individuals.
- It is recommended to divide the intellectual property in the context of the business case.

[25] The word 'negotiation' is questioned for a partnership. The word 'dialogue' might be better suitable. Although legally seen there is no difference, 'dialogue' implies mutual objectives, where negotiation implies contradictive objectives.

[26] Alliance contracting is explained in appendix 03.

- Options for allocation of the intellectual property are:
    - Open source;
    - Transfer by payment;
    - Usability agreement;
    - Allocate the intellectual property to a special purpose vehicle (such as a BV or VOF[27]).

4. Commercialisation

- The objective of the contracting authority is to obtain a solution for the defined problem. Participating a commercial roll-out is not part of this objective.

5. Evaluation and publication

- Publication of project results can be of positive influence for the objectives of the contracting authority and its development partner(s).

06.04 Summary of the particularities of the empirical data

Summarizing the particularities of the empirical data:

- The distinction between the development of something 'new' or 'significantly improved' mainly influences:
    - The description of the challenge.
    - The recommended number of (cross-over) parties in the funnelling process.
    - The timing of discussion about sketches and prototypes.
    - The correlating set-up of the funnelling criteria.
- Contractors prefer to be valued for their knowledgeability and expertise rather than for their ideas.
- Contracting authorities prefer information about the solution direction and plan of action for the 'solution finding'-process.
- The less the funnelling criteria are focussed on a solution direction, the more should be focussed on innovation potential and interaction match.

These results were used as input for a second round of literature studies [chapter 09] and subsequently as basis for the design of the second matrix framework [chapter 10].

[27] A 'BV' is short for 'Besloten Venootschap', which is Dutch for 'private company'. 'VOF' is short for 'Venootschap Onder Firma', which is the Dutch legal term for 'partnership'.

07 TYPES OF CONSTRUCTION-RELATED INNOVATION FOR WHICH THE INNOVATION PARTNERSHIP CAN BE APPLIED

In the first round of literature studies, Henderson and Clark's innovation classification was identified as suitable scientific grounding for the interview process. Analysis of the empirical data showed that construction-related innovation can be categorised in a variety of ways. Moreover, the respondents expect Henderson and Clark's four-part division not as necessary or of influence on their choices and or actions in the procurement process. However, the distinction between 'minor changes' and the development of something 'new' was expected to influence the description of the challenge, the set-up of the funnelling process and the timing of discussion about deliverables as sketches and prototypes.
In this chapter, these findings are reviewed through a second round of literature studies. This done with the objective to establish a practical list of types of construction-related innovation for which the innovation partnership can be applied. This review exists of two steps and according sections:

- Categorisation of construction-related innovation [§07.01].
- Determination of a suitable approach for legitimate application of the innovation partnership [§07.02].

07.01 Categorisation of construction-related innovation

Analysis of the empirical data showed that construction-related innovation can be categorised in a variety of ways [left column in table 7]. Also in policy documents for the construction industry and literature about innovation and innovation in the construction industry a multiplicity of descriptions is identified [right column in table 7] [appendix 04]. This enlistment of descriptions shows a high level of similarities with the categorisation as found in the empirical data [left column in table 7]. The indicated multiplicity of descriptions indicates and verifies the complexity and comprehensiveness of the 'innovation'-concept. From this complexity and comprehensiveness can be concluded that ambiguity regarding the 'innovation'-concept remains, even when a 'suitable' definition for innovation was found to determine the legitimate application of the innovation partnership.

table 7: categorisation of construction-related innovation

Categorisation based on empirical data *[chapter 06]*	**Categorisation based on literature research** *[appendix 04]*
-	The difference between inventions and innovations;
The objectives of innovation;	The aims of innovation.
The means of innovation;	The means of innovation;
The phases of the innovation process;	The stages of innovation;
Classification of the results;	The types of innovation;
The degree of change;	The nature of innovation;
The perspective from which something is deemed innovative.	The social context of innovation;

To conclude, policy documents and literature do not accommodate an unambiguous starting point regarding the applicability of the innovation partnership. Therefore, another solution should be found. This solution lays in the wording *'availability on the market'* (Directive 2014/24/EU Art 31 par 1; Dutch procurement law 2012 (2016) Art 2.31a; Keeley et al., 2013, p. 22). What this solution enhances, is elaborated next.

07.02 Let the market determine

The European and Dutch legislator are not only aware of the stated ambiguity of the 'innovation'-concept, they also presented the solution: Let the contracting authority and the market in collaboration determine whether something is or is not 'innovative', 'new' or 'significantly improved'. Needless to say, this should occur preliminary to the start of the procurement process (Dutch procurement law 2012 (2016) Art 2.126b par 2). Procurement law indicates and allows this pre-competitive interaction with the market as market consultation[28] (Directive 2014/24/EU Art 40; Dutch procurement law 2012 (2016) Art 2.25; Essers & Lombert, 2017, p. 163). During this pre-competitive interaction both the contracting authority and economic operators[29] can argue whether something 'innovative', 'new' or 'significantly improved' needs to be developed to meet the contracting authorities demand. Moreover, the suitability and legitimacy[30] of applying an innovation partnership can be discussed. Contracting authorities are recommended to consult procurement law, policy documents, literature in this decision making. A first hand is included in appendix 04 of this report.

07.03 Implications for this research

To answer sub-question 1c: *For what types of construction-related innovations can the innovation partnership be applied?*
The innovation partnership can be applied for the development of something 'new' or something 'significantly improved', which is verified to be not (yet) available on the market. This conclusion is used as basis for the design of the second matrix framework [chapter 10]. But first the challenges for innovation processes and steps in a development process for construction-related innovations are determined [chapter 08].

[28] The form of interaction does not matter, market explorations or information meetings before the start of the procurement procedure are facilitated under the same article as a 'market consultation' (Innovatiekoffer.nl, n.d.).
[29] It can be assumed that economic operators who respond to the announcement of a market consultation, have sufficient knowledge about whether or not certain products, services or processes are available on the market.
[30] The question remains whether this consultation will result in an unambiguous outcome for the choice of the procurement procedure. After all, procurement is inherent to competition (Directive 2014/24/EU Preamble 1). When a decision appears to be unsuitable for a particular economic operator, this party can determine to lodge objection regarding the choice of the procurement procedure. However, the timing of this objection should be proportionate (Hebly et al., 2016, pp. 9, 17). It can be argued that when the funnelling process of the procurement procedure has started, the possibility to lodge objection has expired. After all, by that time, concerned parties started making significant tendering cost. To conclude, when disputes arise about the legitimate application of the innovation partnership, it is up to lawyers (and judges) to determine the legitimacy of the application of the procedure. Procurement law, policy documents, literature and the market can only advice in the decision of the contracting authority whether the procured demand is really 'innovative', 'new' or 'significant improved'.

08 REQUIREMENTS FOR A DEVELOPMENT PROCESS FOR CONSTRUCTION-RELATED INNOVATION

In chapter 07 a strategy was identified to determine when the innovation partnership can be legitimately applied. When further analysing the description of the innovation partnership in Directive 2014/24/EU Art 31 and Dutch procurement law 2012 (2016) Art 2.126d, becomes clear that the structure of the research and innovation process also requires attention:

> *"The innovation partnership shall be structured in successive phases following the sequence of steps in the research and innovation process, which may include the manufacturing of the products, the provision of the services or the completion of the works (Directive 2014/24/EU Art 31 par 2)."*

In this chapter, the requirements for the development process of a construction-related innovation in the context of the innovation partnership are identified [sub-question 1d]. The requirements are structured in the following seven element and according sections:

- Challenges in an innovation process [§08.01].
- Phases in a creative process [§08.02].
- Involved parties in a creative process [§08.03].
- The level playing field [§08.04].
- The creative playing field [§08.05].
- Moments for interaction and feedback in the innovation partnership [§08.06].

The resulting options to merge the creative process and the funnelling process in the innovation partnership are presented in §08.07.

08.01 Challenges in an innovation process

In the business community there is a search for methods to manage innovation. This search originated in the luring economic benefits and competitive advantages which economic operators associate with 'innovation' (Baregheh, Rowley, & Samrook, 2009, p. 1324; Kuczmarski, 2003, pp. 536, 539; Pries & Dorée, 2005, p. 562). However, applying innovation methods is no recipe for success as: (a) many challenges for innovation can be identified (Berkun, 2007, pp. 44–46), and (b) every method requires adaption to a specific situation (Van Boeijen, Daalhuizen, Zijlstra, & van der Schoor, 2014, p. 11). Therefore, handling these challenges is identified as starting point for the design of a process set-up for the innovation partnership.

Berkun (2007, pp. 44–46) identified eight challenges for innovation. Analysis of these challenges in combination with the characteristics of the innovation partnership shows that [appendix 06]:

- The required flexibility for idea finding and solution finding is facilitated in the innovation partnership [step 1 and 2].
- The business case aspects which determine the financial feasibility of the project, are inherent to participation in the procurement process [step 3 to 8].

To conclude, in terms of innovation management, the challenges for innovation seem to be covered in the set-up of the innovation partnership. However, the suitability of a business case can only be determined after an idea evolved into a (developed) (innovative) solution. In what phases this evolvement can take place, is explained next.

08.02 Phases in a creative process

The development process of an innovation requires facilitation of a creative process (Buijs & Van der Meer, 2013, p. 1; Nyström, 1979). This creative process exists of two main parts: a *problem space* and a *solution space* [figure 19[31]]. The objective of this subdivision is to facilitate questioning the frames of reference of the problem owner and to open up the potential solution space (Buijs & Van der Meer, 2013, pp. 28–31). In the problem space and solution space, three main deliverables can be identified. The development partners should work towards these deliverables via five activities, which are iteratively connected and in which diverging, clustering and converging takes place. The deliverables and activities are:

- Definition of the challenge:
  - Diverging to understand the complexity of the challenge.
  - Clustering and converging to [re-]define or [re-]frame the challenge.
- [Re-]framed problem:
  - Idea generation (diverging) and selection (clustering and converging).
  - Prototyping.
  - Testing.
- Solution.

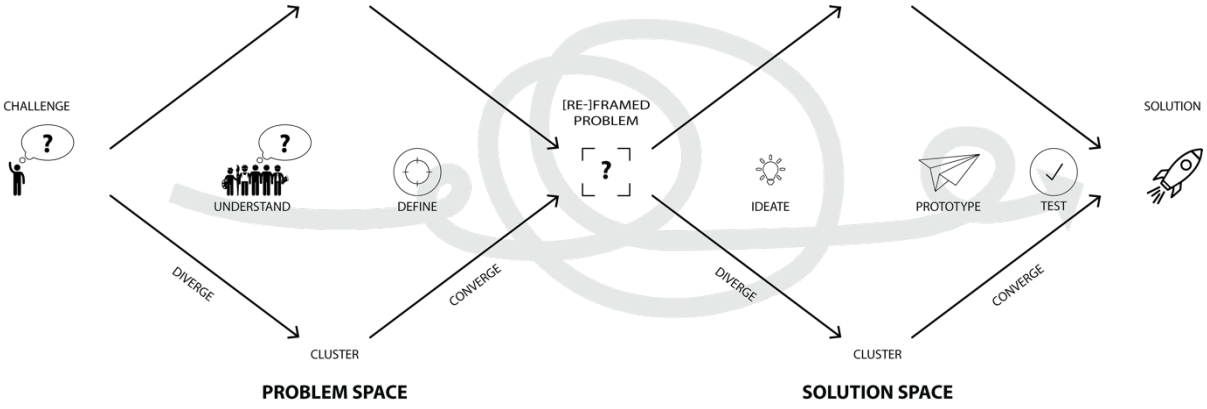

figure 19: a creative process

All these activities and resulting deliverables need to be facilitated in the set-up of the innovation partnership. Moreover, in this creative process, three parties need to be involved. Which three parties this are, is elaborated next.

08.03 Involved parties in a creative process

A creative process demands involvement of three parties [figure 20[32]]:

- *The problem owner*: the person who feels responsible for solving the particular problem (2013, pp. 2, 11, 111; 2009, p. 132). In a procurement process for projects in the built environment, this party is known as a contracting authority (Directive 2014/24/EU Art 2 par 1).
- *A creative facilitator:* the person who is organizing and leading the creative process. In a procurement process for projects in the built environment, this party is known as an advisor (BNA & NLingenieurs, 2011). It is important that the facilitator is an independent party; the

[31] Image by author, based on The Design Council (2018) and Voûte (2018). Altered after Buijs & Van der Meer (2013, p. 13).
[32] Image by author, based on Buijs & Van der Meer (2013) and Tassoul (2009)

facilitator should not have a share in the type of - or the business case underlaying the solution (2013, pp. 2, 11, 111; 2009, p. 133).

- *A resource group:* the individuals who are willing to invest time, knowledge and energy to solve the problem (2013, pp. 2, 11, 111; 2009, pp. 132–135). In a procurement process for projects in the construction, this party is known as a tenderer, economic operator, market party or a candidate (Directive 2014/24/EU Art 31 par 1, par 3). The contracting authority and tenderers can choose to additionally involve independent creative individuals to extra stimulate creativity in the creative process.

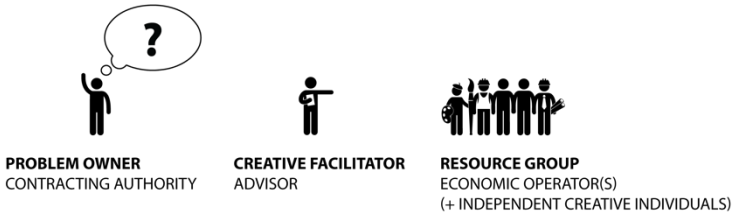

figure 20: three parties which need to be involved in a creative process

During the progress of the innovation partnership, these parties should deal with various rules. These rules are assembled in two denominators: the 'level playing field' and the 'creative playing field. What these rules enhance, is elaborated next.

08.04 The level playing field

The 'rules of the game' for procurement are formed by three principles. These principles should safeguard a 'level playing field' for fair competition between all market parties participating in a procurement process (Essers & Lombert, 2017, p. 192). The procurement principles are [appendix 07]:

- *Equal treatment and non-discrimination:* bidders, competing in a procurement process, have to be treated on an equal and non-discriminating basis (Directive 2014/24/EU Art 18, Dutch procurement law 2012 (2016) Art 1.8; Hebly & Manunza, 2017, p. 29).
- *Transparency:* the procurement process must have a proportionate level of openness. This should be facilitated by opening the market for competition, enabling monitoring, scrutinize decisions and excluding the risk of favouritism and arbitrariness (Directive 2014/24/EU Art 18, Dutch procurement law 2012 (2016) Art 1.9).
- *Proportionality:* contracting authorities have to consider the positive and negative effects of choices they make regarding requirements, conditions and criteria in the procurement process. These choices need to be proportional to the nature and extent of the procured object (Proportionality Guide, 2016, p. 3).

Next to these procurement principles, also the creative process has some rules of the game. To indicate the importance of these principles, they are assembled in the 'creative playing field'.

08.05 The creative playing field

A creative process demands unrestricted, rapid and direct interaction and feedback mechanisms (Buijs & Van der Meer, 2013, pp. 2, 11, 111; Edler et al., 2005, p. I, 9, 203). The unrestricted, rapid and direct character of this type of interaction requires of a 'creative playing field', existing of five creativity principles. Not safeguarding these principles blocks creativity (Adams, 2001; Buijs & Van der Meer, 2013, pp. 103, 104; Hevner, 2007, pp. 148, 149; Tassoul, 2009, pp. 32–43). The five principles are:

On a personal level:

- *Respect:* involved individuals should be able to be sincere and they should be able to be themselves (Adams, 2001; Buijs & Van der Meer, 2013, pp. 103, 104; Hevner, 2007, pp. 148, 149; Tassoul, 2009, pp. 32–43).
- *Trust:* involved individuals should be willing to and dare to share ideas and associations (Adams, 2001; Buijs & Van der Meer, 2013, pp. 103, 104; Hevner, 2007, pp. 148, 149; Tassoul, 2009, pp. 32–43).
- *Discreteness*: involved individuals should be discreet about the outcomes of the creative process towards 'outsiders' (Adams, 2001; Buijs & Van der Meer, 2013, pp. 103, 104; Hevner, 2007, pp. 148, 149; Tassoul, 2009, pp. 32–43). From a financial perspective, market parties want to obtain the competitive advantages which they associate with 'innovation' (Baregheh et al., 2009, p. 1324; Kuczmarski, 2003, pp. 536, 539). Because of these luring benefits, it is very likely that market parties (will) act protective regarding their ideas and fear for cherry picking[33]. From a creativity perspective, market parties should be willing to and dare to share ideas. A protective attitude regarding idea sharing fully blocks a creative process and therewith the innovation process (Adams, 2001; Buijs & Van der Meer, 2013, pp. 103, 104; Hevner, 2007, pp. 148, 149; Tassoul, 2009, pp. 32–43).

On a process level:

- *Reciprocity:* the developed ideas belong to everyone participating in the creative process (Buijs & Van der Meer, 2013, pp. 103, 104; Tassoul, 2009, pp. 32–43).
- *Acceptance:* active involvement of stakeholders eases the acceptance finding process for the suggested ideas. Stakeholders should obtain understanding about the practical added value of the suggested idea to overcome their resistance to change (Buijs & Van der Meer, 2013, pp. 103, 104; Tassoul, 2009, pp. 32–43).

The attentive reader might have noticed that are some tension between these creativity principles and the procurement principles. In the next section is elaborated how this tension can be dealt with.

08.06 Moments for interaction and feedback in the innovation partnership

In §03.01 and §06.02 an overview was provided of the characteristics and procedural aspects that affect the set-up of the innovation partnership. Analysis of these procedural aspects shows that the innovation partnership includes roughly three phases which demand a consecutive order:

- The 'pre-procurement'-phase, in which the procurement procedure is prepared.
- The 'procurement'-phase, in which the main part of the funnelling process towards a suitable partner and the start of the development of the procured demand take place.
- The 'contracting/partnering'-phase, in which the (further) development of the procured demand and optionally the further funnelling (can) take place.

These three phases allow for four formal moments in which (unrestricted), rapid and direct interaction and feedback can take place, while the 'level playing field' and the 'creative playing field' can be safeguarded:

- In the *pre-procurement phase*, the demanded interaction is possible under the heading of *'market consultation'* (Dutch procurement law 2012 (2016) Art 2.25; European Directive 2014/24/EU Art 40; European Commission, 2018, p. 31). Examples of these interaction moments are: market explorations, information meetings, market consultations, etc. (Innovatiekoffer.nl, n.d.). During these moments, the physical presence of the contracting

[33] Cherry picking applies for example, when a contracting authority adopts ideas of tenderer A and asks tenderer B to offer them for a favorable price.

authority, the creative facilitator and the market parties, facilitates rapid and direct interaction and feedback. The unrestricted character can be facilitated when focussing on the challenge formulation [§08.02], the availability of a solution on the market [§07.02] and the set-up of the funnelling process and the development process [§06.03.03].

- In the *procurement phase*, interaction can take place in *negotiation rounds* (Directive 2014/24/EU Art 31 par 3; Dutch procurement law 2012 (2016) Art 2.126c). During these moments, the physical presence of the contracting authority, the creative facilitator and the market parties, facilitates rapid and direct interaction and feedback. The unrestricted requirement can be facilitated when focussing on the analysis of the challenge definition and [re-]framing the problem [§08.02]. Idea generation & selection activities are subject to more tension as contracting authorities need to treat market parties equally and the procurement process should be transparent and proportionate. This means that under certain circumstances, advancing insights regarding instructions for solution directions need to be shared[34] with all market parties to maintain a level playing field, and in particular to safeguard the equal treatment principle (Dutch procurement law 2012 (2016) Art 2.163a – 2.63g; PIANOo, 2018c). This indicates the risk for market parties that (parts of) their ('innovative') ideas are shared with competitors. Although procurement law facilitates to keep certain information confidential [Dutch procurement law 2012 (2016) Art 2.126d par 5), the line between this confidential note and the transparency- and equal treatment principle is thin. However, because of the discreteness principle, this confidentiality issue raises doubts about the real suitability of the negotiation rounds to facilitate idea generation & selection activities.
- The *phase between the preliminary and final award decision* does also allow for interaction. During this phase, physical presence of the contracting authority, the creative facilitator and the awarded market party, facilitates rapid and direct interaction and feedback. However, the interaction and feedback are more restricted: Negotiation is not permitted in this phase (PIANOo, 2018a).
- After the awarding of a contract, in the contracting/partnering-phase: One of the main principles of Dutch contract law is the freedom of contract. In the context of the innovation partnership this characteristic facilitates that discreteness, reciprocity and financial arrangements regarding the (outcomes of a) creative process can be better secured than under procurement law. After all, procurement law requires transparency and equal treatment of all tenderers to not illegitimately influence competition. It should be noted that the proportionality principle does also apply for contract terms (Hebly et al., 2016, p. 64). However, this principle seems not to hinder the demanded unrestricted, rapid and direct interaction and feedback mechanisms.

How these four moments can be merged with the activities and deliverable of a creative process, is elaborated next.

08.07 Options for integration of the creative process and the funnelling process

In §08.02, was indicated that the creative process exists of three main deliverables, which are: the definition of the challenge, the [re-]framed problem and the proposed solution. Additionally, the

[34] During the procurement process, clarification of procurement documents could be requested. The requested clarification could relate to amongst others the demand formulation, the funnelling process, the development process or the business case. To guard the 'level playing field' this requested clarification needs to be provided by means of notes of information (Dutch procurement law 2012 (2016) Art 2.53). In general, applies: when clarification is requested regarding the procurement documents, this information needs to be provided to all optional partners. When information is requested regarding for example a solution direction, this information could be kept confidentially when this does not distort the competition (Dutch procurement law 2012 (2016) Art 2.126a par 6).

creative process exists of five activities, which are: challenge formulation, challenge understanding, idea generation & selection, prototyping and testing. Moreover, it was argued that these iteratively connected deliverables and activities need to be integrated in the linear funnelling process of the innovation partnership.

As indicated in §08.07, the innovation partnership facilitates four moments in which these deliverables and activities can be placed: in the pre-procurement phase, during negotiation rounds, between preliminary and final awarding, and in contracting/partnering-phase. However, there are three more requirements:

- Before procurement starts, the formulated challenge must be clear to all parties (Dutch procurement law 2012 (2016) Art 2.126b par 2). Therefore, the challenge formulation, challenge understanding and challenge definition can only be placed in the pre-procurement phase.
- The [re-]framing of the problem marks both the end of the problem finding process and the start of the solution finding process. Because of the discreteness principle, both the [re-] framing of the problem and the idea generation & selection activities can only start *after* the pre-procurement phase. However, the [re-]framing of the problem should be clear before preliminary awarding because negotiation between this moment and final awarding is not permitted (PIANOo, 2018a).
- The realisation and commercialisation should, because of the reciprocity and proportionality principles, occur in the contracting/partnering-phase.

Based on these requirements, only the idea generation & selection and prototyping & testing activities are characterised by flexible placement in the negotiation rounds, between preliminary and final awarding and in the contracting/partnering phase. Following therefrom, there are six options to merge the iterative creative process with the linear procurement process. These six options, as visualised in table 8, are used as input for the set-up of the second matrix framework.

table 8: options for merging the creative process and funnelling process

[#]	Pre-procurement	Negotiation rounds	Between preliminary and final awarding	Contracting/partnering-phase
1	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem; Idea generation & selection; Prototyping & testing		Realisation and commercialisation of the solution
2	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem; Idea generation & selection	Prototyping & testing	Realisation and commercialisation of the solution
3	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem; Idea generation & selection		Prototyping & testing; Realisation and commercialisation of the solution
4	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem	Idea generation & selection; Prototyping & testing	Realisation and commercialisation of the solution
5	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem	Idea generation & selection	Prototyping & testing; Realisation and commercialisation of the solution
6	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem		Idea generation & selection; Prototyping & testing; Realisation and commercialisation of the solution

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09 POINTS OF ATTENTION FOR THE SET-UP OF THE PROCEDURAL PARAMETES OF THE INNOVATION PARTNERSHIP

During the interview process of this research, practitioners provided suggestions for the set-up of the procedural aspects of the innovation partnership per type of construction-related innovation. To find extra clarification for the data as found in practice, a third literature study was conducted. This study clarifies four points of attention for the set-up of the innovation partnership, to be considered by contracting authorities with a demand for construction-related innovation:

- As indicated in §06.03.03, the formulation and specification of the procured demand is of major influence regarding the enabling of innovation. This also indicated in both innovation management and construction management literature (Arnoldussen et al., 2017, pp. 7, 8, 28, 31; Berg et al., 2014, pp. 18, 39; Buijs & Van der Meer, 2013, pp. 28–31; Chao-Duivis, Hermans, Veen, & Weele, 2017, pp. 4, 8, 12, 14; Edler et al., 2005, p. III; Edquist et al., 2015, p. 59; Georghiou, Edler, Uyarra, & Yeow, 2014, p. 9). The more technical specifications are indicated, the less creativity of tenderers is facilitated to find a suitable solution for formulated challenge. However, a contracting authority applies the innovation partnership when it needs the knowledge and expertise of market parties to develop something 'new' or 'significantly improved' which is not yet available on the market (Dutch procurement law 2012 (2016) Art 2.126b par 2). The ambiguity regarding this solution (direction) indicates that this contracting authority is not (yet) capable of defining (the technical specifications of) the solution. As indicated in chapter 08, this dilemma requires facilitation of a creative process. To facilitate maximum solution space, the contracting authority should focus on the formulation of the challenge and leave the solution direction (completely) open. The solution direction can subsequently logically follow from the problem analysis and the diverging, clustering and converging activities. Therefore, it is recommended to formulated the challenge on an as high as possible level. This level is illustrated in the 'Nordic Five Level Structure' [figure 21]. This structure differentiates between the definition of the strategic objectives, the design principles, the performance specifications, the verification methods and the references. This differentiation indicates that definition of the challenge on a strategic objective-level facilitates iteration between the lower levels. Additionally, this positively influences to guard the equal treatment-principle [§08.04], while facilitating unrestricted interaction and feedback to identify solution directions [§08.05].

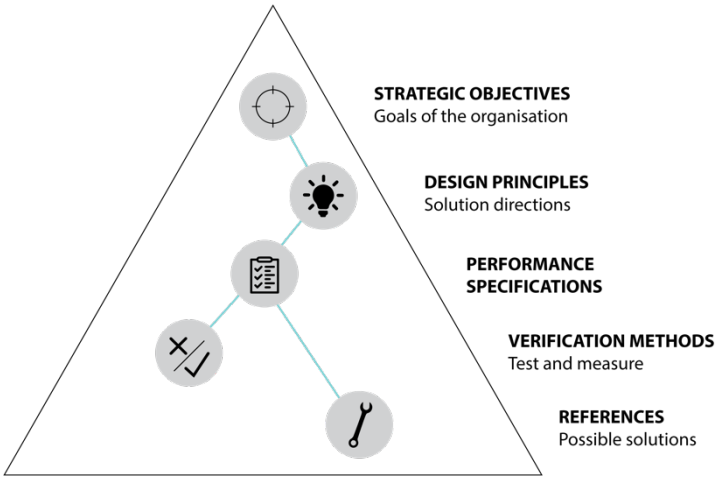

figure 21: Nordic Five Level Structure

- As indicated and verified by practitioners [§06.03], the naming of the innovation partnership, arouses the appearance that some kind of partnership-based contract terms apply when using this procurement procedure. They suggested to set-up these partnership terms as alliance contract. This suggestion as also indicated in literature: Innovation can be stimulated by (pre-competitive) integral collaboration and alliancing, in which is aimed at shared objectives, trust and transparency (Berg et al., 2014, pp. 11–12, 45; Chao-Duivis et al., 2017, pp. 5, 7, 10, 11, 14, 15; Edler et al., 2005, p. III; Edquist et al., 2015, p. 304; Georghiou et al., 2014, p. 9; Head & Alford, 2015, p. 726; Kuczmarski, 2003, p. 540; Rijkswaterstaat et al., 2016, p. 3; Senaratne & Sexton, 2011, p. 10). The pre-competitive requirement can be facilitated in the pre-procurement phase, as discussed in chapter 08.

- Building on this suggestion for alliance contracting: Practitioners also indicated that the innovation partnership demands a tailor-made contract with a valid business cases for all involved parties. The following subjects require attention in the set-up of such a contract: performance incentives, sales guarantees, profits, losses, (dosed) financing, (un)certainty and (intellectual) property. These finding are also indicated in construction industry-based literature (Arnoldussen et al., 2017, pp. 8, 9, 16, 17, 27–29, 42; Berg et al., 2014, pp. 9, 12, 18, 40, 43; Chao-Duivis et al., 2017, p. 14; Edler et al., 2005, pp. III, XI; Georghiou et al., 2014, p. 9; Kamerstuk 34329 nr. 3, 2015, p. 7; PIANOo, 2016; Ries, 2017, p. 210; Rijkswaterstaat et al., 2016, pp. 1, 6; Senaratne & Sexton, 2011).

- Practitioners indicated that the set-up of funnelling criteria in the partner finding process requires thorough attention. The set-up of these criteria can (unintentionally) enable or restrict participation of parties that can provide innovative solutions. Also this finding is indicated in construction industry-based literature (Arnoldussen et al., 2017, p. 28; Berg et al., 2014, pp. 9, 43; Edler et al., 2005, p. I; Georghiou et al., 2014, p. 9).

The clarification of these four points of attention for the set-up of the innovation partnership helped to design the second matrix framework. This framework is provided in the next chapter.

10 SECOND MATRIX FRAMEWORK

The second matrix framework indicates which procedural aspects affect the set-up of the procedure [vertical axis] per type of construction-related innovation [horizontal axis]. The proposed set-ups of the procedural aspects of the innovation partnership per type of construction-related innovation are enlisted in the cells. In each of these cells, the difference in answering of the four resource groups is indicated when dissimilarities were found.

table 9: second matrix framework

<table>
<tr><th>[#]</th><th>Procedural aspect</th><th>Types of innovation</th><th></th></tr>
<tr><td colspan="2"></td><td>Significant improvement</td><td>New</td></tr>
<tr><td colspan="2">Pre-procurement</td><td colspan="2"></td></tr>
<tr><td>0.1</td><td>Challenge formulation</td><td colspan="2">As high as possible in the pyramid of the ‘Nordic Five Level Structure’. Preferably on the strategic objective’-level, to facilitate maximum solution space.</td></tr>
<tr><td>0.2</td><td>Market consultation</td><td>Subjects for discussion:
▪ Procurement process;
▪ Development process;
▪ Challenge formulation;
▪ Challenge understanding;
▪ Challenge definition;
▪ Solution direction.</td><td>Subjects for discussion:
▪ Procurement process;
▪ Development process;
▪ Challenge formulation;
▪ Challenge understanding;
▪ Challenge definition.</td></tr>
<tr><td colspan="4">1. Funnelling process</td></tr>
<tr><td>1.1</td><td>Number of candidates / tenderers / partners per funnelling round</td><td colspan="2"><table><tr><th>Funnelling round</th><th>Number of candidates / tenderers</th></tr><tr><td>Subscription</td><td>N</td></tr><tr><td>Pre-selection round
▪ Exclusion grounds</td><td>N>X</td></tr><tr><td>Optional: further selection round(s)
▪ Suitability requirements
▪ Selection criteria</td><td>X>5
X>3</td></tr><tr><td>Awarding</td><td>1, 2, 3</td></tr></table>The number of optional development partners for the development of something ‘significantly improved’ can be lower than for the development of something ‘new’.</td></tr>
<tr><td>1.2</td><td>Exclusion grounds</td><td colspan="2">Mandatory and facultative exclusion.</td></tr>
<tr><td>1.3</td><td>Suitability criteria</td><td colspan="2" rowspan="2">▪ General knowledgeability and expertise of (individual employees of) the company. Especially regarding:
▪ Interaction-match*;
▪ Innovation potential*.
▪ Effectiveness of used plan of action of projects performed in the past;
▪ General vision on themes of the challenge;

* The interaction-match can be measured through a collaboration assessment. The innovation potential can be measured through a creative equity scan (Versteeg et al., 2018).</td></tr>
<tr><td>1.4</td><td>Selection criteria</td></tr>
<tr><td>1.5</td><td>Awarding sub-criteria</td><td colspan="2">▪ General knowledgeability and expertise of (individual employees of) the company. Especially regarding:
▪ Interaction-match;</td></tr>
</table>

		▪ Innovation potential. ▪ Solution direction (vision, concept, sketch, prototype, performance)**; ▪ Plan of action for the 'solution finding'-process; *** Depends level of detail of challenge formulation and the demand for something 'significant improved' or something 'new'.*	
1.6	Go/no-go moments	▪ The level of the design: from 'sketch' up to 'prototype'; ▪ The performance of the prototype.	
1.7	Objection term	The legal minimum length of the objection term can be shortened when mutually agreed upon.	
2. Solution finding process			
2.1	Notes of information	Distinguish between general notes of information and confidential notes of information;	
2.2	Subjects for discussion in the negotiation rounds	▪ The process design of the development process; ▪ The [re-]framing of the problem; ▪ The business case and the contract terms; ▪ Social aspects of collaboration and interaction; ▪ Team composition; ▪ Solution direction; ▪ Performance of the prototype.	▪ The process design of the development process; ▪ The [re-]framing of the problem; ▪ The business case and the contract terms; ▪ Social aspects of collaboration and interaction; ▪ Team composition.
3. Contracting			
3.1	Contract form	Alliancing	
3.2	Business case	Business case aspects which need to be discussed are: ▪ Cost and benefit sharing/division during procurement; ▪ Cost and benefit sharing/division in the contracting/partnering-phase; ▪ Cost and benefit sharing/division in the commercial phase; ▪ Intellectual property; ▪ Arrangement per go/no-go moment.	

3.2.1	Intellectual property	▪ In a creative process, the process results are property of all participating individuals;
		▪ Options for allocation of the intellectual property are:
		  ▪ Open source;
		  ▪ Transfer by payment;
		  ▪ Usability agreement;
		  ▪ Allocate the intellectual property to a special purpose vehicle (e.g. BV or VOF).	

3.3	Subjects for discussion in the contracting/partnering-phase	▪ Realisation; ▪ Commercialisation.	▪ Solution direction *; ▪ Performance of the prototype *; ▪ Realisation; ▪ Commercialisation.
4. Commercialisation		The objective of the contracting authority is to obtain a solution for the defined problem. Participating in a commercial roll-out is not part of this objective.	
5. Evaluation and publication		Publication of project results can be of positive influence for the objectives of the contracting authority and its development partner(s).	

In the next chapter, the verification, supplementation, refinement and validation of this second matrix framework is elaborated.

11 VERIFICATION AND VALIDATION OF THE SECOND MATRIX FRAMEWORK

The second matrix framework provides a comprehensive overview of suggestions for the set-up of the innovation partnership. Because of this comprehensiveness, it was not deemed feasible to validate the complete framework. Therefore, only the three key determinants for the set-up of the innovation partnership were selected for verification and validation. These key determinants sections are:

- The moments for creative interaction during an innovation partnership [§11.01].
- The possibilities to merge the creative process and the funnelling process [§11.02].
- The set-up of selection criteria, awarding sub-criteria and discussion subjects [§11.03].

11.01 Verification of moments for interaction during an innovation partnership

In §08.06, four moments were identified in which creative interaction between the contracting authority and tenderers could take place [second and third column in table 10]. Discussion between members of the focus group confirmed and validated the possibility for creative interaction on three of these moments [right columns in table 10]:

- *Preliminary to the procurement process, in a market consultation:* This interaction moment facilitates a first plenary discussion between a contracting authority and market parties about the formulated challenge and the set-up of the procurement process. This approach safeguards the equal treatment principle and facilitates the resource group(s) to both: (a) [re-] define and [re-]frame the identified problem and (b) voice requirements for the set-up of the procurement process.
- *During the procurement process, in negotiation rounds:* These rounds facilitate confidential interaction between the contracting authority, the creative facilitator and individual tenderers. However, the line between the confidentiality and the transparency principle is thin. This indicates doubts about the real suitability of the negotiation rounds to facilitate idea generation & selection activities. After all, a creative process demands discreteness about outcomes of the process towards 'outsiders'.
- *After the awarding of a contract, in the contracting/partnering-phase:* Contract law facilitates freedom of contract. Which in the context of the innovation partnership means that discreteness, reciprocity and financial arrangements regarding the (outcomes of a) creative process can be better secured than under procurement law.

table 10: interaction moments which are suitable for interaction

	Second matrix framework		Results verification and validation session	
Phase	**Interaction moments**	**Moments suitable for creative interaction**	**Interaction moments**	**Moments suitable for creative interaction**
Pre-procurement	Market consultation	Market consultation	Market consultation	Market consultation
During procurement			Presentations for rating based on selection criteria	
	Negotiation rounds	Negotiation rounds	Negotiation rounds	Negotiation rounds
	Between preliminary and final awarding	Between preliminary and final awarding		
			Information notices	
			Presentations for rating based on awarding	
After procurement	Contracting/partnering-phase	Contracting/partnering-phase	Contracting/partnering-phase	Contracting/partnering-phase

As indicated in table 10, three extra moments for interaction were suggested. However, the members of the focus group also indicated that these three moments, including the phase between preliminary and final awarding of a contract, are not suitable for the required creativity facilitating interaction:

- The presentation moments were disqualified because they have an explanatory character rather than that they can facilitate idea generation & selection or prototyping & testing activities.
- Also the phase between preliminary and final awarding of a contract was disqualified: it has the purpose to discuss details of the contract rather than to facilitate idea generation & selection or prototyping & testing activities.
- The information notices can have a physical character. Which means that the contracting authority, the creative facilitator and the tenderers are in the same room when the notice is provided. This set-up facilitates the same interaction as applies for negotiation rounds. For convenience, this type of information notices and negotiation rounds are considered the same. The term 'negotiation round' will further be used.

11.02 Verification of options to merge the creative process and the funnelling process

In §08.08, six options were defined to merge the creative process and the funnelling process. However, as indicated in §11.01, the phase between preliminary and final awarding was identified as not suitable to facilitate idea generation & selection or prototyping & testing. Therefore, three options remain [table 11].

table 11: validated options for merging the creative process and funnelling process

[#]	Pre-procurement	Negotiation rounds	Contracting/partnering-phase
1	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem	Idea generation & selection Prototyping & testing Realisation and commercialisation
2	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem Idea generation & selection	Prototyping & testing Realisation and commercialisation
3	Challenge formulation Challenge understanding Challenge definition	[Re-]framing of the problem Idea generation & selection Prototyping & testing	Realisation and commercialisation

Discussion between the members of the focus group about these three options indicated that:

- When both idea generation & selection and prototyping & testing take place *after* the awarding of a contract [table 11, option 1], selection and awarding sub-criteria should operate on a less detailed level concerning technical knowledge about the demanded innovation. This indicates the need for other selection and awarding criteria than traditionally used. [Suggestion for these criteria are discussed in §11.03].
- The set-up in which idea generation & selection and *a first round* of prototyping & testing take place *before* the awarding of a contract [combination of option 2 and 3], is compared with the more or less 'standardised', ingrained and frequently used set-up of procurement procedures as applied when a contracting authority already knows what (type of) solution it is buying [§01.02].
- It is expected that there is too much financial pressure on the tenderers when both idea generation & selection and prototyping & testing activities take place *before* the awarding of a contract [option 3]. To positively influence the financial feasibility of the innovation process, the prototyping & testing activities can best take place under contract terms.

The second and the third note show that a combination of option 2 and 3 of table 11 is possible. However, the prototyping & testing activities can best take place after the awarding of a contract. The third note indicates that option 3 is not suitable for the set-up of an innovation partnership. As a result, and to prevent ambiguity about the level of overlap between options, option 1 and 2 were used as input for the validation step [§11.03].

11.03 Validation of the set-up of selection criteria, awarding sub-criteria and discussion subjects

In the third part of the session, the suggested options for the set-up of selection criteria, awarding sub-criteria and discussion subjects were validated. This validation was executed for the two verified suitable set-ups of the innovation partnership:

- Option 1: In which idea generation & selection and prototyping & testing take place after the awarding of a contract. The suggested set-up for this option is shown in table 12 on the next page.
- Option 2: In which prototyping & testing take place after the awarding of a contract. The suggested set-up for this option is shown in table 13 on the next page.

The differences[35] between the two tables are *italicized*.

The focus group made two notes regarding these two options:

- The stated selection criteria could also be set-up as suitability criteria. This means that these criteria do not have a ranking-character, but a pass/fail-character. This approach can thus be used to filter and reduce the number of potential development partners, before the start of a more time demanding part of the funnelling process. For example: execution of a collaboration assessment is time demanding, especially for the contracting authority. They have to participate in an assessment with every tenderer. By using suitability criteria, unsuitable market parties can preliminary be excluded from participation in these assessments.
- A contracting authority can decide to enter into a contract with multiple tendering consortia. Especially for the development of something 'new' this can create difficulties for the funnelling process because the idea generation & selection and prototyping & testing actitivies take place after the awarding of a contract. To facilitate further funnelling under contract terms, it is recommended to apply go/no-go moments.

Based on the content of table 12 and table 13 and above stated notes, it is concluded that:

- Regarding suitability requirements, selection criteria and awarding sub-criteria a distinction can be made between the knowledgeability and expertise of the company and the individuals involved in the project. This means that a market parties can get a contract awarded based on its general expertise but also based on the deployment of its employees.
- Selection should amongst others be based on the interaction match between the contracting authority and the optional development partner(s). This approach facilitates and stimulates both the contracting authority and the development partner(s) to enter into a partnership before prototyping & testing and or idea generation & selection activities are undertaken.
- Pushing the idea generation & selection and prototyping & testing activities forward in the procurement process, has two consequences for the funnelling criteria:
    - For the set-up of suitability criteria, selection criteria and awarding sub-criteria should be focused on interaction match (social and for business) and on proven

[35] Note that the differences between the tables seem small, but have big implications for the set-up of the innovation partnership. The idea generation and selection activities shift from the negotiation phase to the contracting/partnering-phase, influencing the set-up of the awarding sub-criteria and the go/no-go moments in the contracting/partnering-phase.

knowledgeability and expertise of the company and individuals contributing to the project. After all, no idea direction is determined yet.

- And consequently, attention for the selection of ideas and prototypes shifts to go/no-go moments during the contracting/partnering-phase. Which means that also these criteria should be developed and clearly articulated before the start of the procurement process.

table 12: option 1: idea generation & selection and prototyping & testing after the awarding of a contract

Funnelling criteria	
Selection criteria	**Awarding sub-criteria**

▪ Proven knowledgeability and expertise of the company and individuals contributing to the project regarding:
  ▪ Their innovation capacity;
  ▪ The type of the assignment;
  ▪ Their financial capacity;
  ▪ Interaction match (social and for business).
	▪ Plan of action regarding project objectives;
	▪ Proven knowledgeability and expertise of the company and individuals contributing to the project regarding:
	  ▪ *Their innovation capacity;*
	  ▪ *Performance assurance.*

Discussion subjects			
Pre-procurement	**Negotiation rounds**	**Between preliminary and final awarding**	**Contracting/partnering-phase**
▪ Set-up and do's and don'ts in the procurement process and development process; ▪ Challenge formulation.	▪ [Re-]framing of the defined problem; ▪ Idea direction; ▪ Progress development process; ▪ Knowledgeability for development progress; ▪ Contract/business case.	▪ Contract terms.	▪ Technical progress and forecast; ▪ Financial progress and forecast; ▪ Risks; ▪ Planning progress and forecast; ▪ Human resources.

table 13: option 2: prototyping & testing after the awarding of a contract

Funnelling criteria	
Selection criteria	**Awarding sub-criteria**

▪ Proven knowledgeability and expertise of the company and individuals contributing to the project regarding:
  ▪ Their innovation capacity;
  ▪ The type of the assignment;
  ▪ Their financial capacity;
  ▪ Interaction match (social and for business).
	▪ *Solution direction;*
	▪ Plan of action regarding project objectives;
	▪ Proven knowledgeability and expertise of the company and individuals contributing to the project regarding:
	  ▪ Prototyping and testing.

Discussion subjects			
Pre-procurement	**Negotiation rounds**	**Between preliminary and final awarding**	**Contracting/partnering-phase**
▪ Set-up and do's and don'ts in the procurement process and development process; ▪ Challenge formulation; ▪ *Solution direction.*	▪ [Re-]framing of the defined problem; ▪ Idea direction; ▪ Progress development process; ▪ Knowledgeability for development progress; ▪ *Testing of prototypes;* ▪ Contract/business case.	▪ Contract terms.	▪ Technical progress and forecast; ▪ Financial progress and forecast; ▪ Risks; ▪ Planning progress and forecast; ▪ Human resources.

11.04 Implications for this research

The validation of the moments for creative interaction, the options to merge the creative process and funnelling process, and the set-up of selection criteria, awarding sub-criteria and discussion subjects shows that there are three main implications for the set-up of the innovation partnership:

- In §11.01 and §11.02 was verified that idea generation & selection can take place *before and after* the awarding of a contract. But it was also indicated that it is recommended to place the prototyping & testing activities *after* the awarding of a contract, because it positively influences the feasibility of the business case underlying the innovation process.
- In §11.03 was indicated that it is recommended to select optional development partners on the interaction match (social and for business) they have with the contracting authority.
- Pushing the idea generation & selection and prototyping & testing activities forward in the innovation partnership, has two consequences for the funnelling criteria:
    - For the set-up of suitability criteria, selection criteria *and awarding sub-criteria* should be focused on proven knowledgeability and expertise of the company and individuals contributing to the project. After all, no idea direction is determined yet.
    - And consequently, attention for selection of ideas and (performance of) prototypes shifts from the awarding sub-criteria to the go/no-go moments during the contracting/partnering-phase.

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12 (DRAFT) GUIDE(S) AND ITS VALIDATION

This research aims to design a practical guide to set up the innovation partnership. The guide is specifically designed for project managers of Dutch contracting authorities with a demand for construction-related innovation. The main aim of this design process was to make the guide as practical as possible; the design had to be concise and simple to understand and be readily applicable by practitioners. To reach this aim, the development occurred via an iterative design process [§02.08].

In previous chapters the various elements and their influence on the design of the guide were thematically discussed: In chapter 03, the legal characteristics of the innovation partnership were elaborated and an overview was provided of the legal aspects that affect the set-up of the procedure. In §06.03.01, this overview was complemented with practitioners' perception of the innovation partnership. In chapter 04 and 07 different types of construction-related innovation were identified. And in chapter 08, the requirements for and the phases of a development process for a construction-related innovation were elaborated. Both theory [chapter 03, 08 and 09] and practice [chapter 06 and 11] contributed to the design for the set-up of the innovation partnership. This information was during the research process assembled in intermediate frameworks [chapter 05 and 10]. Multiple consecutive design iterations refined the draft guide(s). In this chapter, the answers to all sub-questions are assembled and the second last step of this research is taken: the final design of the innovation partnership guide. This stand-alone version of the guide is ready for testing in practice. The guide is included as appendix 12 of this report.

In the next chapter, the thesis is concluded and the main research question of this research is answered: how to set up the procurement procedure of the innovation partnership for contracting authorities with a demand for construction-related innovation, such that the right partner can be selected for the development process towards the fulfilment of the contracting authority's ambition.

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13 CONCLUSION

The innovation partnership is new procurement procedure which was introduced in Dutch procurement law on July 1st, 2016. Because of its recent introduction, the experience of Dutch contracting authorities with the innovation partnership is limited. Especially for procurement projects in the built environment (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.). This research was conducted to provide additional knowledge about the innovation partnership, by particularly aiming at the development of a guide to set up an innovation partnership. The main research questions following from this objective was:

> *How to set up the procurement procedure of the innovation partnership for contracting authorities with a demand for construction-related innovation, such that the right partner can be selected for the development process towards the fulfilment of the contracting authority's ambition?*

To answer this research question, first the characteristics of the procedure were identified. The innovation partnership is intended to strengthen and integrate the innovation chain, facilitating research, development and commercial purchase of something innovative *in a single procurement procedure* (European Commission, 2010, p. 10). This innovation can be something 'new' or 'significantly improved' which is verified to be not (yet) available on the market. Facilitating this distinctive 'single procurement procedure' characteristic, the innovation partnership recognises three, relatively unknown, features of procurement law (Directive 2014/24/EU Art 31, Dutch procurement law 2012 (2016) Art 2.31a, §2.3.8.7a):

- The possibility to let the development process take place before and/or after the awarding of a contract.
- The possibility to award a contract to multiple parties.
- The possibility to progress the funnelling after the awarding of a contract, by applying go/no-go moments.

Research indicated that there are seventeen key procedural aspects, divided over five parallel processes, that affect the set-up of the innovation partnership. These processes are: demand formulation, partner finding, solution finding, commercialisation and reflection. Moreover, procurement for innovation appear to have heavier requirements for interaction and feedback mechanisms than procurement processes for known solution directions. This demands that contracting authorities not only focus on safeguarding the 'level playing field', via the equal treatment-, transparency- and proportionality principle. Contracting authorities should also simultaneously design a procurement process that safeguards a 'creative playing field', which consist of respect, trust, discreteness, reciprocity and acceptance. Because practitioners indicated that these creativity principles thrive best under contract conditions, it is recommended to let the majority of the research and development activities take place after the awarding of a contract. This positively influences amongst others discreteness-, reciprocity- and financial arrangements regarding the (outcomes of a) creative process.

To answer the research question: based on the identified characteristics, requirements and principles, this research showed various options to set-up the innovation partnership. To provide simplicity in the complexity of the procedure, two extremes were identified and discussed:

- For the development of something 'significantly improved' it is recommended to let idea generation & selection activities take place before the awarding of a contract. Prototyping & testing activities should take place after the awarding of a contract. This set-up facilitates to award tenderers on amongst others their suggested ideas, while the major part of the creative and iterative process is facilitated under contract terms. This anticipates on the, by practitioners indicated, request for discreteness-, reciprocity- and financial feasibility

regarding the (outcomes of a) creative process. The division of idea generation & selection and prototyping & testing activities in this procurement set-up approaches the, in the Dutch construction industry, frequently used and ingrained way of procurement which can be used when a contracting authority already knows what (type of) solution it is buying.

- For the development of something 'new' it is recommended to place both idea generation & selection and prototyping & testing activities in the contracting/partnering-phase, initially leaving the exact solution (direction) ambiguous. This set-up suits the requirements for a creative process best: leaving solution directions completely open and instead focussing on the formulated challenge. The solution direction subsequently follows logically from the problem analysis and the diverging, clustering and converging activities. This option requires awarding on innovation potential and interaction match, which can be measured by tools such as a creative equity scan and a collaboration assessment.

This research showed that there is tension between the requirements for innovation processes and procurement processes. It was indicated that practitioners in the Dutch construction industry badly recognize the room procurement law facilitates for creativity. Moreover, practitioners find it difficult to facilitate creativity in procurement processes which are aimed at selection of (a) suitable partner(s) for the development of a construction-related innovation. This research stressed this tension by addition of a 'creative playing field' to the well-known 'level playing field'. Furthermore, suggestions were made to merge procurement law's linear funnelling process, with the iterative creative process, resulting in the innovation partnership guide. Because practitioners have the tendency to stick to the frequently used and ingrained set-up approaches for procurement processes, it remains to be seen whether the innovation partnership will be used to its full potential. Multiple contracting authorities see the potential of the innovation partnership and have been trying to set-up the procedure (Hofmeijer & Rasenberg, 2018; Ted, n.d.; TenderNed, n.d.). However, it appears to be a real challenge to meet all practitioners demands.

14 DISCUSSION AND RECOMMENDATIONS FOR FURTHER RESEARCH

This chapter contains two sections: In the first section, the limitations of the research methodology and the research scope are discussed. Furthermore, remarks are made about the interpretation of the research results and the (higher) research objective. The first section is concluded with reflection on the research' scientific and practical relevance. In section two, recommendations for further research are provided.

14.01 Discussion

14.01.01 Limitations of the research methodology

Based on the chosen research methodology, the following limitations should be considered:

- Because time was limited, only a first version of the guide was developed. However, the added value of design research and action research is not only to identify, create and build a socio-technical artefact, but also to implement, evaluate and improve the specific suggested intervention (Baskerville & Myers, 2004, pp. 329, 330; Cole et al., 2005, pp. 325, 326; Fellows & Liu, 2015, p. 23; Gregor & Hevner, 2013, p. 337; Hevner & Chatterjee, 2010, p. ix, 5; Järvinen, 2007, pp. 37–42). This missing implementation step in the method for this research is also a recommendation for further research: apply the guide for the set-up of a procurement process which helps to find a partner for the development of something which is not (yet) available on the market. Because of the different suggested set-ups, it is recommended to apply the guide for both the development of something 'new' and something 'significantly improved'. Evaluation of the chosen set-up can show if practitioners are capable of using the guide. It is recommended to evaluate this suitability after each milestone of the five parallel processes the guide indicates: demand formulation, partner finding, solution finding, commercialisation and reflection. This could for example be done by interviewing responsible project managers of both the contracting authority and the tenderer and explore whether the intermediate results suit their demands and expectations. Positive and negative findings can subsequently be included in the guide as learning and recommendation for consecutive procurement processes.

- Time also influenced the selection of the practitioners who were invited to validate the concept versions of the guide. For further validation it is recommended to alter selection criteria and broaden the group of practitioners who validate the guide's design. Suggestions for this altered and broadened criteria are provided in §14.02.

- Analysis of reactions of interviewees showed that they found it difficult to deviate from the current practical status quo of procurement in the Dutch construction industry and to adopt new theoretical possibilities. This can be concluded from amongst others their limited recognition of procurement law's possibility to (1) let the research and development process take place before and after the awarding of a contract, to (2) award to multiple parties and to (3) continue the funnelling process after the awarding of a contract [§03.01 and §06.03.01]. Because these three features are suggested for the set-up of the innovation partnership, it can be assumed that it is hard for the validating practitioners to determine whether the guide is suitable in practice.
  An approach to break through the status quo could be to reverse the research approach and start the research process from the innovation management perspective rather than from the procurement perspective. The added value of this approach would be to open up the practitioners' frame of reference regarding procurement for innovation. A method to reach

this, could be to organise creative sessions with a broad variety of practitioners and map the objectives, wishes and requirements for an innovation processes in the context of the built environment. Thereafter, suggestions could be proposed to merge problem space and the solution space into procurement phases, as indicated in the illustration of the innovation partnership [figure 2]. It can be assumed that some requirements, such as the discreetness- and transparency principle, may conflict. These will in all likelihood relate to the iteration and creative playing field demanding development process, and the linear and level playing field demanding funnelling process.

- The semi-structured interview approach facilitated the researcher to reformulate interview questions to obtain in-depth data about aspects of the innovation partnership. Repeated attempts to obtain certain answering could have biased the response of the interviewees. It was tried to overcome this bias by sending back the summary of the interview for verification. Another approach to obtain empirical data, while minimising potential researcher bias, would have been to conduct a survey or to organise a workshop and observe the interaction between the participants. However, the current research methodology was chosen because it was assumed that interviewees would find it difficult to deviate from the current practical status quo of procurement in the Dutch construction industry and to adopt new theoretical possibilities.

14.01.02 Limitations of the research scope

Based on the scope definition of this research [§01.05], the following limitations should be considered:

- This research is conducted in the context of the construction industry. Therefore, the developed guide can only be applied for purchasing development processes for construction-related demands. Theoretically seen, the guide can also be used in other sectors. However, various prerequisites should be considered, such as culture, business cases and project lead time.

- This research was focused on the set-up of the procurement procedure of the innovation partnership. However, the designed guide also includes recommendations for the set-up of the contracting/partnering-phase of the procedure. Because time was limited, little research was conducted into the implications of these recommendations in contract law. Further research into partnership-based contracting, such as alliance contracting [appendix 03], could be a valuable contribution for further development of the guide. It could provide important suggestions for discussion about- and for the set-up of business case aspects [chapter 09] and the demarcation/distribution of liability and responsibility. The latter are in literature indicated as important contractual aspects which require attention, in particular for a partnership (Chao-Duivis, Koning, & Ubink, 2013, pp. 25–27).

- As indicated in the scope [§01.05], innovation management consist of managing creative *persons,* who participate in a creative *process.* And this process takes place in a creative *environment* and facilitates the development of a creative *product*: the 'innovation'. The creative environment was out of scope of this research. This indicates the risk that existing departments within organisations of contracting authorities are not equipped with the required knowledge to facilitate the phases of the creative process and therewith impede the development of the demanded innovation. It would be a valuable contribution to both theory and practice to explore if and how this impeding should or could be prohibited.

14.01.03 Discussion about the interpretation of the results

Some points of discussion should be noted regarding the interpretation of the finding of this research:

- As argued in §06.03, there is a difference between the theoretical and the perceived distinctive characteristics of the innovation partnership. The innovation partnership was mostly perceived by practitioners to facilitate five possibilities:
  - To purchase something 'new' or 'significantly improved' which is not yet available on the market.
  - To let the research and development process, take place before and after the awarding of a contract.
  - To award to multiple parties.
  - To continue the funnelling process after the awarding of a contract, by applying go/no-go moments.
  - To collaborate in partnership.

  But the actual legal distinctive characteristic of the innovation partnership is the coupling of R&D and large-scale purchasing *in a single procurement procedure* [chapter 03]. Moreover, above stated features are (and have been) facilitated before and after the amendment of Dutch procurement law 2012 (2016).
  It could be argued that presenting the innovation partnership to the interviewees as 'enabler' instead of 'facilitator' of these functionalities, is a methodological mistake. And that procurement theory should have been unambiguously clear before the start of the interview process.
  However, it is perhaps more important that there is dissonance between (a) the above stated theoretical possibilities of Dutch procurement law, and (b) the, by practitioners, perceived possibilities of procurement law for Dutch construction practice [§06.03.01]. This latter aspect can be mainly clarified by the frequently used and ingrained procurement approaches for purchasing known (types of) solutions [§01.02]. It remains to be seen whether practitioners will be able to deviate from the current status quo and actually integrate and facilitate innovation processes in procurement procedures, such as the innovation partnership, when they are used for construction-related innovation projects.

- In this research was discussed that a procurement procedure demands linear progress and that a creative process demands iteration. Merging these processes resulted in a guide for the innovation partnership. The suggested set-up for the innovation partnership contains a chronological order, but facilitates room for iteration. Although it was not indicated by the interviewees, it can be assumed that in practice, the in the guide recommended order of steps will be intermingled. This intermingling can be clarified by financial- and/or time-related issues. Practically this means that irrevocable[36] choices for solution directions or for the development process could have been made without consultation of potential development partners. The fact that this data was not mentioned by the interviewees could be explained via two lines of argument: Firstly, no specific interview questions addressed the importance of a step-wise process in the pre-procurement phase. Another explanation is that financial- and/or time-related issues in the Dutch construction industry outweigh the estimated consequences of deviating from the recommended step-order. Empirical data about this tension between the creative process and financial- and/or time-pressure could be retrieved through further explorative research with two types of practitioners: Those who are responsible for the set-up of procurement processes and those who are experienced with

[36] These choices might be irrevocable because no substantial changes may be made to the set-up of the procurement process, during its progress (Dutch procurement law 2012 (2016)).

innovation- and creativity- management. It is likely that the data retrieved from this explorative research will verify the above stated tension.

14.01.04 Reflection on the research objective

The objective of this research was to design a guide for project managers of Dutch contracting authorities with a demand for construction-related innovation to set up the innovation partnership, such that the right partner(s) can be selected for the development process towards the fulfilment of the contracting authority's ambition. The outcomes of this research show some points for discussion regarding the achievement of this goal:

- The European and Dutch legislator included three relatively unknown aspects of procurement law in the legal description of the innovation partnership:
    - The possibility to let the development process take place before and/or after awarding of a contract.
    - The possibility to award a contract to multiple parties.
    - The possibility to progress the funnelling after the awarding of a contract, by applying go/no-go moments.

  These three aspects form a very important part of the potential set-ups which this research proposes for the innovation partnership. However, these three aspects are not solely restricted for application in the innovation partnership. The recommended set-ups of the procedure can also be used to facilitate R&D processes in other procurement procedures [§03.01]. Therefore, the results of this research reach further than the design of a guide for the set-up for the innovation partnership. The only restriction is that other procedures may not be used to purchase both R&D and commercial development activities in a single procurement process [§03.01.01].

- There is dissonance between the theoretical possibilities procurement law facilitates, and the perception and preferred procurement approaches of procurement practitioners. This raises questions about the suitability of the innovation partnership in the context of the built environment. This doubt is strengthened by two considerations:
    - Although construction methods, -elements, -products and materials have a highly repetitive character (Durmisevic, 2006, p. 117), the resulting real-estate or civil engineering works have limited repetitive features [appendix 04.01]. This indicates a restricted market for large-scale commercialisation of this real-estate or civil engineering work [§03.01.01].
    - The innovation partnership facilitates R&D and commercial development in a single procedure. Because R&D is (generally) considered by practitioners to cause long lead times, the suitability of the coupling with commercial development in a procurement process in the context of the built environment, is doubtful. After all, construction projects often have a strict planning and do not tolerate long lead times for research and development.

14.01.05 Reflection on the objective of the innovation partnership

The innovation partnership is a new procurement procedure, which is specifically designed by the European Commission to combat the challenges the European Union faces, such as: climate change, energy and resource efficiency and health and demographic change (European Commission, 2010, p. 10). Because of the preparation- and progress time of a procurement process and the restricted application of the innovation partnership, there is not much knowledge about the practical suitability of the procedure (Hofmeijer & Rasenberg, 2018). Therefore, the influence and the effectiveness of the procedure in the pursuit of the European objective remains to be seen.

14.01.06 Scientific relevance of this research

The scientific relevance of this research relates to the relevant recent introduction of the innovation partnership in Dutch procurement law. Because of its recent introduction, individuals might misinterpret the possibilities of the procedure (Hofmeijer, 2017, p. 16). Moreover, researchers indicated the demand for an integrated research into procurement management and innovation management (Uyarra & Flanagan, 2010, p. 140). The combination of these findings demonstrates the need for further research [§01.02].
Hofmeijer (2017, p. 15) started this research and indicated a strategy consisting of attention points and considerations for the usability of the innovation partnership, when applied for 'mobility'- and 'infrastructure'-projects. However, Hofmeijer did not address the (methodological) question about how to practically apply the theoretical possibilities of the innovation partnership for construction-related innovation. More specifically, he indicated the various steps of innovation processes (2017, pp. 45–50), but kept the integration possibilities with the procurement procedure of the innovation partnership fully open for interpretation of contracting authorities and market parties (2017, p. 85). This research aimed to bridge exactly this gap between innovation partnership- and innovation management-related literature and the practical application of the procurement procedure in the context of the built environment.
This resulted in two suggested set-ups of the innovation partnership for application in the context of the built environment. One to facilitate the development of something 'new'. And one to facilitate the development something 'significantly improved'. These set-ups are accompanied by a visualisation of five parallel processes: demand formulation, partner finding, solution finding, commercialisation and reflection [figure 2]. And an indication of the actions which need to be undertaken including the interrelation between them. Next to this visualisation of processes and indication of actions, the 'level playing field' was complemented with a 'creative playing field'. The latter was introduced to indicate the importance of a creativity facilitating mindset for innovation trajectories in procurement context.

14.01.07 Practical relevance of this research

As indicated in the problem definition, Dutch contracting authorities have limited knowledge about how to apply the innovation partnership in the context of the built environment. This research aimed to bridge the gap between innovation partnership- and innovation management-related literature and the application of the procedure. The practical relevance of this research requires discussion of two subjects, which are elaborated in the following two paragraphs.

In this research it was made clear that procurement law facilitates more possibilities for the set-up of procurement processes than is perceived by practitioners:

- Research and development processes can take place before and after the awarding of a contract.
- Contracting can be awarded to multiple parties.
- And funnelling processes can be continued after the awarding of a contract, by applying go/no-go moments.

Whether these features will be used in practice, remains to be seen. After all, the frequently used and ingrained procurement set-ups are used for a reason: the minimal margins (Arnoldussen et al., 2017, pp. 30, 31; Koenen, 2015) and the accompanied risk averse attitude contracting authorities and market parties in the Dutch construction sector (Amann & Essig, 2015, p. 282; Arnoldussen et al., 2017, p. 32; Uyarra & Flanagan, 2010, p. 134). Application of above stated features in practice is required to verify their added value and show whether they are feasible under the stated conditions. Therewith it can pave the way for further application. Either in the set-up of an innovation partnership, or in the set-up of another procurement procedure.

In the guide, the development of something 'new' and something 'significantly improved' are distinct. It could be argued that a categorisation of the actual appearance of the innovation would have been more practical than categorisation of degrees of innovativeness [chapter 04 and 07]. It can be assumed that this practicality is of added value for the development of something 'significantly improved'. After all, in such a situation it is likely that a solution direction is already known before the start of the procurement process. Knowing whether to improve for example a profit model, a process or a product system [appendix 04.03], might influence the innovation process. The steps in the creative process and the funnelling process may stay the same. However, aspects such as the progress time of the R&D process and the testing possibilities for prototypes will show differences. It is likely that these changes will affect the (financial) risks which could be taken, and as a result the (risk averse) attitude of involved individuals in setting up a procurement process.
On the other hand, there is the development of something 'new'. The appearance of this solution cannot be known before the start of a procurement process, after all: 'new' means that the solution does not exist (yet). Therefore, categorisation on the actual appearance of the innovation is not possible for this type of innovation.
The categorisation of degrees of innovativeness has also its benefits. It suits the requirements for a creative process: leaving solution directions completely open and focussing on the formulated challenge. The solution direction subsequently follows logically from the analysis, diverging, clustering and converging activities [chapter 08]. Therefore, with this approach there is most room for the development of something new.
However, innovation in the context of the built environment will probably mainly be of a more incremental nature (Pries & Dorée, 2005, p. 562). Therefore, it is assumed of added value to conduct further research into the influence of the categorisation of something 'significantly improved' on the suggested set-ups for the innovation partnership.

14.02 Recommendations for further research

This thesis is concluded with recommendations for further research:

- The developed guide searches the boundaries of the manoeuvre space procurement law recognises for the set-up of procurement processes. As argued [§14.01.04], this guide can also be suitable for the set-up of other procurement procedures when used for purchasing (the development of) something 'new' or 'significantly improved', rather than via the innovation partnership. The verification of this assumption could be researched by applying this guide for procuring demands for construction-related innovation and using another procedure than the innovation partnership.

- In this research it is suggested to select or award market parties on their innovation potential. This can be measured by a creative equity scan [§04.06]. This scan is developed by design agency VanBerlo and is currently (2018) tested in practice. Research could be conducted to identify the actual suitability of this scan and suggest possible alterations for application as selection or award criterium in procurement projects in the Dutch construction industry.

- The designed guide is solely validated by advisors. This is one of the four stakeholder groups which were identified for this research. Validation with more practitioners (of other groups) may improve the suitability of the guide for application in practice. It could be interesting to strictly differentiate between:
    - Practitioners working on different types of construction projects. For example: infrastructure and real-estate or building components and architecture. It can be assumed that they have a different perspective on innovation management and creative processes. Moreover, different markets demand different innovations. This

indicates that other process requirements might affect the set-up of the innovation partnership.
    - Practitioners with long, medium or short working experience in the construction industry. There could be a difference in their openness for 'other' procurement approaches than the frequently used ones [§01.05]. It can be assumed that 'young(er)' individuals have less experience and are therefore less bound to a status quo. This may facilitate them to think in possibilities, instead of sticking to ingrained methods.
    - Practitioners experienced with projects in or outside the Dutch construction industry. There could be a difference in frequently used procurement approaches and in innovation- and creativity management approaches.
    - Representatives of other types of contracting authorities than interviewed for this research. In European and Dutch procurement law, a multiplicity of contracting authorities is identified. Because time was limited, only representatives of three types of contracting authorities were found willing to participate in this research. It would be interesting to involve more representatives of other types of contracting authorities to verify whether their answering differs from previously obtained data. This data can for example be obtained from companies with a, to some extent, predictable commercial development demand such as special-sector companies.

- For this research three types of creativity and innovation management were used: creativity management literature for product development; general innovation management literature; and innovation management literature for the construction industry. Little literature about creative processes for specifically the built environment was found. Therefore, it could be of added value to conduct (further) case study research into creative processes in the context of the built environment, as which is started by practitioners participating in 'De Bouwcampus' (Nienhuis, 2018). A case study research is deemed most suitable because it provides an in-depth understanding of a small number of cases in a real-world context (Yin, 2012, p. 4). Analysis of these cases might show that these creative processes have (slightly) other requirement than the in literature identified product innovation trajectories.

- In creativity management literature (Buijs & Van der Meer, 2013; Tassoul, 2009), various tools are recommended to stimulate diverging, clustering and converging activities for idea finding, idea selection and idea improvement. A simple and frequently used example is: brainstorming with post-its, categorisation of these post-its, selection of suitable post-its and further development of the ideas on these post-its. It could be helpful to improve and develop specific tools for sub-phases of creative processes in the context of procurement projects in the built environment. Suggestions of tools which could be (made) suitable for construction practice are: 'guided fantasy' and the 'morphological chart'. These tools could be developed by independent creative facilitators. Testing of these tools could be done in organisations such as 'LEF future center', which was founded with the objective to facilitate sessions aiming at breaking through ingrained patterns (Rijkswaterstaat, 2018b).

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APPENDIX 01: THE PROCUREMENT CONTEXT OF THE INNOVATION PARTNERSHIP

In chapter 03, the characteristics of the innovation partnership are thematically discussed. However, to see all the possibilities the innovation partnership facilitates, the procurement context in which the procedure can be used should also be clear. In this appendix, the procedure's five main contextual aspects are elaborated [figure 22]:

- The objectives of procurement.
- The influence of European procurement law on Dutch procurement law.
- The essential legal guidelines which one should understand to comprehend the context of the innovation partnership:
    - When to procure.
    - What to procure.
    - Procurement principles.
    - The available procurement procedures.

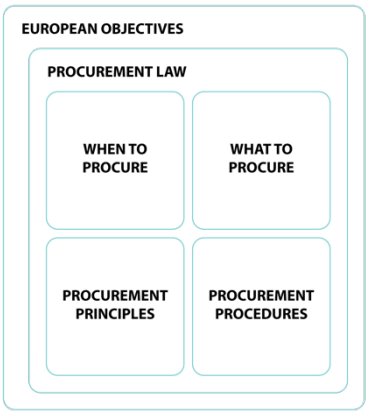

figure 22: context diagram innovation partnership

01.01 The objectives of procurement

The context of the European procurement law is defined in the preambles of the Directive 2014/24/EU. Following the basis for European law, as consolidated in the treaty on European Union (2012b) and the treaty on the function of the European Union (2012a), the objective of European procurement is to open the markets of all member states in order to enable free movement of goods, freedom of establishment and freedom to provide services in a competitive manner.

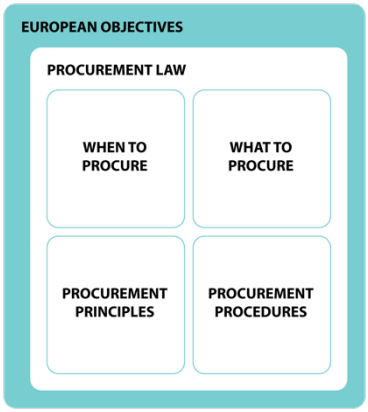

figure 23: context diagram innovation partnership: European objectives

The European Union identified procurement as an important market instrument to reach the smart, sustainable and inclusive growth targets which were outlined in the 2020-vision (Directive 2014/24/EU preamble 2). According to research of the European Commission, the European market for governmental acquisition spans 10 to 35% of the GDP of the member states. The European Union therefore annotates procurement as an effective instrument to reach its intended objectives (Essers & Lombert, 2017, p. 27; European Commission, 2011a, p. xx).

01.02 What is procurement law

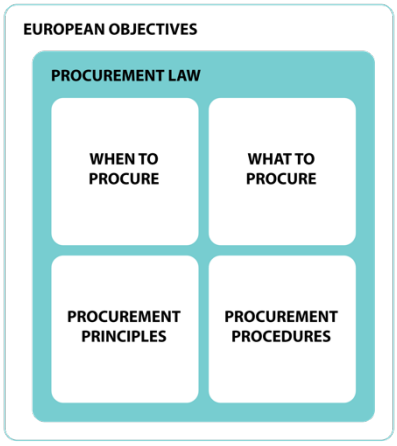

figure 24: context diagram innovation partnership: procurement law

To reach it intended market objectives, the European Union formulated a set of rules on procurement, "aimed at the acquisition of works, supplies or services for consideration by means of a public contract (Directive 2014/24/EU preamble 4)." These rules are further specified and explicated in a European laws, regulations and administrative provisions.

01.03 Dutch procurement law

Dutch procurement law [Aanbestedingswet 2012 (2016)] is directly influenced by European procurement law (Directive 2014/24/EU; Dutch procurement law 2012 (2016) Art 90 par 1); meaning that national procurement follows European procurement law, whenever possible (ARW, 2016, p. 460; Essers & Lombert, 2017, pp. 28, 327).

Dutch procurement law is accompanied by the Dutch Proportionality Guide. This guide is written as flanking policy for the Dutch procurement law (Kamerstukken II number 32440). In this guide various details and instructions for procurement processes can be found. The objective of this guide is to increase the level of uniformity, transparency, possibilities for and proportionality of, between and within procurement projects (Hebly & Manunza, 2017, pp. 32, 33; Hebly et al., 2016, p. 3).

The Dutch procurement law obliges contracting authorities to apply the 'Procurement Regulations Works' (Aanbestedingsreglement Werken 2016, further: "ARW 2016") for works under the European thresholds[1] (Dutch procurement law 2012 (2016), Art 1.22 par 1). The ARW 2016 follows the Dutch procurement law 2012 (2016) and provides a detailed overview of process steps for procurement.

[1] These thresholds are further specified in subsection 03.01.05.

01.04 Definition of procurement

In European procurement law (Directive 2014/24/EU), procurement is defined as:

> *"The acquisition by means of a public contract of works, supplies, or services by one or more contracting authorities, whether or not the works, supplies or services are intended for a public purpose (*Directive 2014/24/EU *Art 1 par 2)."*

The Dutch procurement law, the Dutch proportionality Guide and the ARW 2016 do not contain a definition of procurement. Though, a Dutch interpretation of the definition of procurement can be found in legal supporting literature:

Essers (2017, pp. 15, 25) based his definition of procurement on Dutch jurisprudence:

> *"A way of purchasing in which one or more companies have the opportunity to submit a tender for an assignment or to sign a framework agreement."*

PIANOo (2017d), the Dutch expertise centre for procurement, defines procurement as follows:

> *"Procurement is a weighted manner to contract an appropriate contract partner with the most suitable product (service / work) for the most suitable price, in which price / quality ratio is the most important factor. […] The term 'procurement' is generally used for the sourcing phase of the purchasing process. In this process, specification, selection and contracting take place."*

Summarizing:

- Procurement enhances acquisition / purchasing of *works*, *supplies*, or *services* whether or not those are intended for a *public purpose*.
- Procurement deals with contracting authorities (*clients*) and *bidders* / *candidates* (possible contract partners)[2].
- A *funnelling process* is used, to identify and purchase an *economic most advantageous offer*.

What these *works*, *supplies*, *services*, *public purpose*, *contracting authorities*, *clients*, *bidders*, *candidates*, *funnelling processes* and *economic most advantageous offers* enhance, is elaborated next.

[2] A bidder / candidate is an economic operator (a single company, a person or a group; and a contractor, service provider or supplier) participating in a procurement process. Depending on the phase of the process, a candidate or bidder is also referred to as tenderer (Essers & Lombert, 2017, p. 17).

01.05 When to procure

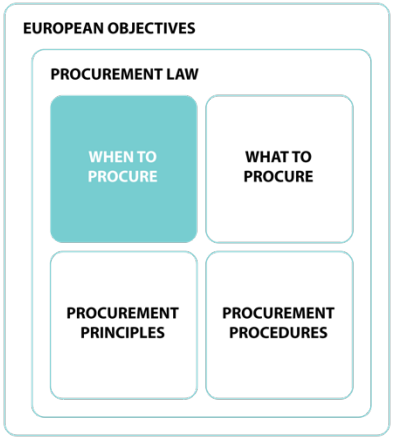

figure 25: context diagram innovation partnership: when to procure

Within European and Dutch procurement law, it is specified whether or not there is an obligation to procure. This depends upon the follow three factors, which are further elaborated below:

- The client is or is not a contracting authority [§01.05.01].
- Whether the contract value is above or under the European threshold for public contracts [§01.05.02].
- Whether the contract does or does not include cross-border interest [§01.05.03].

01.05.01 Contracting authorities, subsidy holders, concessionaires and non-contracting authorities

Contracting authorities

To find out whether a party has the obligation to procure, it should be determined whether the party is a contracting authority or a non-contracting authority. Contracting authorities are: the state, regional or local authorities [such as a province, a municipal authority and a water board], a body governed by public law, or an association formed by one or more such authorities or one or more such bodies governed by public law[3] (Directive 2014/24/EU Art 2 par 1; AW 2012 (2016) Art 1.1; Chao-Duivis, Koning, & Ubink, 2013, p. 137; Essers & Lombert, 2017, p. 15; PIANOo, 2017a).

A list of bodies of the central government and a list of bodies governed by public law are published in Directive 2014/24/EU Annex 1 and on the website of the Dutch Government (Rijksoverheid, 2005a; 2005b). These lists are indicative because they are frequently updated. Therefore, contracting authorities should act in accordance with the guidelines as indicated in Directive 2014/24/EU Article 2 par 1 and Dutch procurement law 2012 (2016) Article 1.1 (Interdepartementaal Overlegorgaan Europese Aanbestedingen, 2002; Rijksoverheid, 2005b; 2005a).

Subsidy holders and concessionaires

Next to contracting authorities, also subsidy holders and concessionaires[4] should comply with Directive 2014/24/EU and Dutch procurement law 2012 (2016). This compliance is applicable when

[3] With associations formed by local authorities and bodies governed by public law is meant: "any body established for specific purpose of meeting needs in the general interest, not having an industrial or commercial character, having legal personality and financed, for the most part, by the State, a provincial or municipal authority, a water board or other body governed by public law, or subject to management supervision by the State, a provincial or municipal authority, a water board or other body governed by public law, or having an administrative, managerial or supervisory board, more than half of whose members are appointed by the State, a provincial or municipal authority, a water board or other body governed by public law (Dutch procurement law 2012 (2016) Art 1.1; Chao-Duivis et al., 2013, p. 137; PIANOo, 2017b)."

[4] A concessionaire is defined as a third party which executes the assignment for a contracting authority (PIANOo, 2017b).

works or service contract are subsidised directly by contracting authorities by more than 50% and the estimated value exceeds the European thresholds for public contracts, as defined below (Directive 2014/24/EU Art 13).

Non-contracting authorities
Non-contracting authorities can choose whether or not to award their contracts by means of a procurement procedure. In principle, non-contracting authorities are not obliged to comply with Directive 2014/24/EU and Dutch procurement law 2012 (2016). When a contract is awarded to a contractor without a procurement procedure, this is called direct contracting (Chao-Duivis et al., 2013, p. 137; Essers & Lombert, 2017, pp. 25, 325).

01.05.02 European thresholds for public contracts

A second factor which determines the obligation to procure, is the thresholds for European procurement. These thresholds are set to ensure that the procurement principles have their practical effect and contribute to the EU goals of effective free movement of goods, freedom of establishment and freedom to provide services in a competitive manner (Directive 2014/24/EU preamble 1). The level of the thresholds are revised biannually (Chao-Duivis et al., 2013, p. 138; PIANOo, 2017c). Assignments below the thresholds can be procured on a national level, which in The Netherlands should be in line with ARW 2016 (Dutch procurement law 2012 (2016), Art 1.22 par 1). Dutch procurement law refers to the thresholds as those set in Directive 2014/24/EU Article 4. The current thresholds are set for the period January 1st, 2018 until December 31st, 2019 [table 14] (PIANOo, 2018b).

table 14: threshold amounts for public contracts

Procurer	Products and services	Works
State	€ 144,000.-	€ 5,548,000.-
Decentral government and bodies governed by public law	€ 221,000.-	€ 5,548,000.-

01.05.03 Cross-border interest

When a contracting authority intends to procure an assignment under the European thresholds, for which there is cross-border interest, the contracting authority is obliged to procure on a European level (Dutch procurement law 2012 (2016), Art 1.7). The cross-border interest can relate to the value-, the technical characteristics and the geographical location of the assignment (Essers & Lombert, 2017, p. 38).

01.06 What to procure

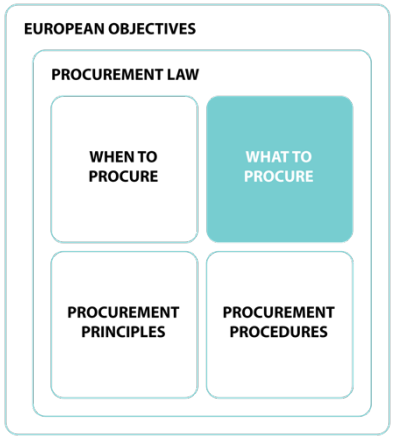

figure 26: context diagram innovation partnership: what to procure

A second element which is specified in the definition of procurement is 'what to procure'. The acquisition process can lead to the purchase of: services, supplies or works. What these terms entail, is elaborated next.

Service

"'public service contracts' means public contracts having as their object the provision of services other than […]:

a. the execution, or both the design and execution, of works related to one of the activities within the meaning of Annex II.
b. the execution, or both the design and execution, of a work.
c. the realisation, by whatever means, of a work corresponding to the requirements specified by the contracting authority exercising a decisive influence on the type or design of the work (Directive 2014/24/EU Art 2 par 6, Art 2 par 9)."

Supply

"'public supply contracts' means public contracts having as their object the purchase, lease, rental or hire-purchase, with or without an option to buy, of products. A public supply contract may include, as an incidental matter, siting and installation operations (Directive 2014/24/EU Art 2 par 8)."

Work

"'a work' means the outcome of building or civil engineering works taken as a whole which is sufficient in itself to fulfil an economic or technical function (Directive 2014/24/EU Art 2 par 7)." As this research is focused on construction-related[5] demands, the focus will be on the procurement process of 'works'.[6]

[5] As defined in §01.05.
[6] The discussion about whether or not a building can function as a service, is out of scope for this research.

01.07 Procurement principles

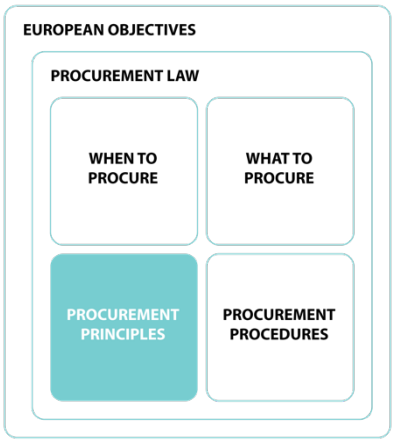

figure 27: context diagram innovation partnership: procurement principles

Procurement law and the definition of procurement also includes the rules of the game which one should respect when designing or following a procurement procedure. These are called: procurement principles. The procurement principles are: equal treatment, non-discrimination, proportionality and transparency (Directive 2014/24/EU Art 18, Dutch procurement law 2012 (2016) Art 1.8 and 1.9). The sum of these principles is expected to result in a level playing field for all economic operators who take part in the procurement competition (Essers & Lombert, 2017, p. 192). The rules also safeguard the proportionality of contracts and contract terms (Hebly et al., 2016, p. 64). The impact of these principles for the set-up of the innovation partnership is discussed in §08.06.

Equal treatment and non-discrimination
These principles have the objective to treat bidders, competing in a procurement process, on an equal and non-discriminating basis (Directive 2014/24/EU Art 18, Dutch procurement law 2012 (2016) Art 1.8; Hebly & Manunza, 2017, p. 29).

Transparency
The transparency principle has the objective to reach a proportionate level of openness in the procurement process by opening the market for competition, enabling monitoring, scrutinize decisions and excluding the risk of favouritism and arbitrariness (Directive 2014/24/EU Art 18, Dutch procurement law 2012 (2016) Art 1.9). Contracting authorities should specify their demand in a clear, precise and unambiguous way. Contracting authorities should publish both the intention to procure an assignment or close a deal, and the motivation of the awarding decision. The latter should be specified in an anonymised matrix including the awarding criteria (Hebly & Manunza, 2017, pp. 30, 31).

Proportionality
The objective of the proportionality principle is to let contracting authorities consider the positive and negative effects of choices they make regarding requirements, conditions and criteria in the procurement process. These choices need to be proportional to the nature and extent of the procured object (Proportionality Guide, Hebly et al., 2016, p. 3). Areas to which the proportionality principle amongst others applies are: the combination of procured objects, grounds for exclusion of competitors, suitability requirements of competitors, terms of the assignment, award criteria of bidders, compensation of transaction costs of bidders and contract conditions. When a contracting authority wants to deviate from the proportionality principle, the ‘act or explain’ principle applies (Hebly & Manunza, 2017, pp. 32, 33).

01.08 Procurement procedures

European and Dutch procurement law provide multiple procurement procedures to facilitate the procurement process [table 15[7]]. Each procedure has its own characteristics regarding funnelling criteria, interaction moments and suitability for a certain type of assignments.

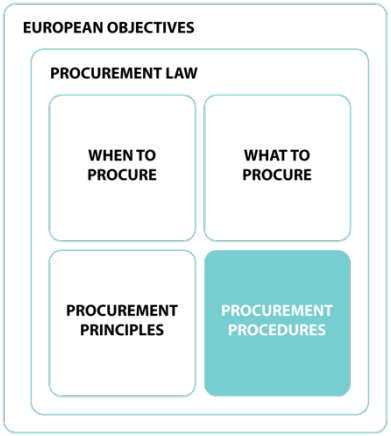

figure 28: context diagram innovation partnership: procurement procedures

table 15: European procurement

Procurement procedure (English)	Procurement procedure (Dutch)
Open procedure	Openbare procedure
Restricted procedure	Niet-openbare procedure
Competitive dialogue	Concurrentiegerichte dialoog
Competitive procedure with negotiation	Mededingingsprocedure met onderhandeling
Negotiated procedure without prior publication	Onderhandelingsprocedure zonder aankondiging
Direct agreement procedure	Meervoudig onderhandse procedure
Innovation Partnership	Procedure van het innovatiepartnerschap
Framework agreement with single supplier	Raamovereenkomst met een enkele ondernemer
Framework agreement with multiple suppliers	Raamovereenkomst met meerdere ondernemers
Procedure for social and other specific services	Procedure voor sociale en andere specifieke diensten
Open design contest	Openbare prijsvraag
Restricted design contest	Niet-openbare prijsvraag
Procedures for dynamic purchasing systems	Instelling van, toelating tot en plaatsen van opdracht binnen een dynamisch aankoopsysteem
Concession procedure	Concessieprocedure
Alteration of assignments	Wijziging van opdrachten

[7] Paraphrased after Directive 2014/24/EU, Dutch procurement law 2012 (2016), ARW 2016, Essers & Lombert (2017, p. 68) and Chao-Duivis et al. (2013, p. 139).

APPENDIX 02: THE INNOVATION PARTNESHIP IN EUROPEAN AND DUTCH PROCUREMENT LAW

This appendix contains the legal descriptions of the innovation partnership as part of the European and Dutch procurement law.

The innovation partnership in the European procurement law
The innovation partnership is described in Article 31 of Directive 2014/24/EU.

Art 31 par 1. In innovation partnerships, any economic operator may submit a request to participate in response to a contract notice by providing the information for qualitative selection that is requested by the contracting authority.

In the procurement documents, the contracting authority shall identify the need for an innovative product, service or works that cannot be met by purchasing products, services or works already available on the market. It shall indicate which elements of this description define the minimum requirements to be met by all tenders. The information provided shall be sufficiently precise to enable economic operators to identify the nature and scope of the required solution and decide whether to request to participate in the procedure.

The contracting authority may decide to set up the innovation partnership with one partner or with several partners conducting separate research and development activities.

The minimum time limit for receipt of requests to participate shall be 30 days from the date on which the contract notice is sent. Only those economic operators invited by the contracting authority following the assessment of the information provided may participate in the procedure. Contracting authorities may limit the number of suitable candidates to be invited to participate in the procedure in accordance with Article 65. The contracts shall be awarded on the sole basis of the award criterion of the best price-quality ratio in accordance with Article 67.

Art 31 par 2. The innovation partnership shall aim at the development of an innovative product, service or works and the subsequent purchase of the resulting supplies, services or works, provided that they correspond to the performance levels and maximum costs agreed between the contracting authorities and the participants.

The innovation partnership shall be structured in successive phases following the sequence of steps in the research and innovation process, which may include the manufacturing of the products, the provision of the services or the completion of the works. The innovation partnership shall set intermediate targets to be attained by the partners and provide for payment of the remuneration in appropriate instalments.

Based on those targets, the contracting authority may decide after each phase to terminate the innovation partnership or, in the case of an innovation partnership with several partners, to reduce the number of partners by terminating individual contracts, provided that the contracting authority has indicated in the procurement documents those possibilities and the conditions for their use.

Art 31 par 3. Unless otherwise provided for in this Article, contracting authorities shall negotiate with tenderers the initial and all subsequent tenders submitted by them, except for the final tender, to improve the content thereof.

The minimum requirements and the award criteria shall not be subject to negotiations.

Art 31 par 4. During the negotiations, contracting authorities shall ensure the equal treatment of all tenderers. To that end, they shall not provide information in a discriminatory manner which may give some tenderers an advantage over others. They shall inform all tenderers whose tenders have not been eliminated, pursuant to paragraph 5, in writing of any changes to the technical specifications or other procurement documents other than those setting out the minimum requirements. Following those changes, contracting authorities shall provide sufficient time for tenderers to modify and re-submit amended tenders, as appropriate.

In accordance with Article 21, contracting authorities shall not reveal to the other participants confidential information communicated by a candidate or tenderer participating in the negotiations without its agreement. Such agreement shall not take the form of a general waiver but shall be given with reference to the intended communication of specific information.

Art 31 par 5. Negotiations during innovation partnership procedures may take place in successive stages in order to reduce the number of tenders to be negotiated by applying the award criteria specified in the contract notice, in the invitation to confirm interest or in the procurement documents. In the contract notice, the invitation to confirm interest or in the procurement documents, the contracting authority shall indicate whether it will use that option.

Art 31 par 6. In selecting candidates, contracting authorities shall in particular apply criteria concerning the candidates' capacity in the field of research and development and of developing and implementing innovative solutions.

Only those economic operators invited by the contracting authority following its assessment of the requested information may submit research and innovation projects aimed at meeting the needs identified by the contracting authority that cannot be met by existing solutions.

In the procurement documents, the contracting authority shall define the arrangements applicable to intellectual property rights. In the case of an innovation partnership with several partners, the contracting authority shall not, in accordance with Article 21, reveal to the other partners solutions proposed or other confidential information communicated by a partner in the framework of the partnership without that partner's agreement. Such agreement shall not take the form of a general waiver but shall be given with reference to the intended communication of specific information.

Art 31 par 7. The contracting authority shall ensure that the structure of the partnership and, in particular, the duration and value of the different phases reflect the degree of innovation of the proposed solution and the sequence of the research and innovation activities required for the development of an innovative solution not yet available on

the market. The estimated value of supplies, services or works shall not be disproportionate in relation to the investment required for their development.

The innovation partnership in Dutch law

The innovation partnership procedure is included in Dutch Procurement law 2012 (2016) under Article 1.1, 2.31b, 2.126b, 126c and 126d.

The definition is as follows [Dutch]:

"procedure van het innovatiepartnerschap: procedure waarbij alle ondernemers een verzoek tot deelneming mogen indienen naar aanleiding van een aankondiging voor een opdracht die is gericht op de ontwikkeling en aanschaf van een innovatief product of werk of een innovatieve dienst welke niet reeds op de markt beschikbaar is en waarbij door middel van onderhandelingen met een of meer van hen naar definitieve inschrijvingen wordt toegewerkt; (Dutch procurement law 2012 (2016) Art 1.1)."

In Article 2.31b of Dutch procurement law 2012 (2016), the procedural steps are listed as follows [Dutch]:

"De aanbestedende dienst die de procedure van het innovatiepartnerschap toepast doorloopt de volgende stappen. De aanbestedende dienst:

a. maakt een aankondiging van de overheidsopdracht bekend;
b. toetst of een gegadigde valt onder een door de aanbestedende dienst gestelde uitsluitingsgrond;
c. toetst of een niet-uitgesloten gegadigde voldoet aan de door de aanbestedende dienst gestelde geschiktheidseisen;
d. beoordeelt de niet-uitgesloten of niet-afgewezen gegadigden aan de hand van de door de aanbestedende dienst gestelde selectiecriteria;
e. nodigt de geselecteerde gegadigden uit tot het doen van een eerste inschrijving;
f. onderhandelt met de inschrijvers over hun eerste en daaropvolgende inschrijvingen, met uitzondering van de definitieve inschrijving, om de inhoud ervan te verbeteren, met dien verstande dat niet wordt onderhandeld over de gunningscriteria en de minimumeisen;
g. beoordeelt de definitieve inschrijvingen aan de hand van door de aanbestedende dienst gestelde minimumeisen en het door hem gestelde gunningscriterium de economisch meest voordelige inschrijving op basis van de beste prijs-kwaliteitverhouding en de nadere criteria, bedoeld in artikel 2.115;
h. maakt een proces-verbaal van de opdrachtverlening;
i. deelt de gunningsbeslissing mee;
j. kan de overeenkomst sluiten;
k. maakt de aankondiging van de gegunde overheidsopdracht bekend."

In Article 2.126b, 126c and 126d of Dutch procurement law 2012 (2016), the procedure is described as follows [Dutch]:

Article 2.126b:

1. "Bij toepassing van de procedure van het innovatiepartnerschap geschiedt de gunning van de overheidsopdracht op basis van het criterium de economisch meest voordelige inschrijving op basis van de beste prijs-kwaliteitverhouding.

2. De aanbestedende dienst beschrijft in de aanbestedingsstukken zijn behoefte aan innovatieve producten, diensten of werken en geeft aan dat met de aanschaf van reeds op de markt beschikbare producten, diensten of werken niet in die behoefte kan worden voorzien.
3. De aanbestedende dienst bepaalt in de aanbestedingsstukken tevens welke elementen van de in het tweede lid bedoelde beschrijving de minimumeisen zijn waaraan de inschrijving moet voldoen.
4. De aanbestedende dienst verschaft in de aanbestedingsstukken informatie die voldoende nauwkeurig is om ondernemers in staat te stellen te bepalen wat de aard en strekking van de gevraagde oplossing is en te beslissen over deelneming aan de procedure.
5. Indien de aanbestedende dienst door toepassing van de gunningscriteria de procedure van het innovatiepartnerschap in opeenvolgende fasen wil laten verlopen, zodat het aantal inschrijvingen waarover moet worden onderhandeld wordt beperkt, vermeldt hij dat in de aanbestedingsstukken.
6. De aanbestedende dienst bepaalt in de aanbestedingsstukken welke regels op de intellectuele eigendomsrechten van toepassing zijn.
7. Bij het selecteren van de gegadigden past de aanbestedende dienst in het bijzonder criteria toe inzake het potentieel van de kandidaten op het gebied van onderzoek en ontwikkeling en hun vermogen om vernieuwende oplossingen te ontwikkelen en toe te passen.
8. Alleen de ondernemers die na beoordeling van de gevraagde informatie door de aanbestedende dienst daartoe worden uitgenodigd, kunnen projecten voor onderzoek en ontwikkeling indienen die voldoen aan de door de aanbestedende dienst vastgestelde behoeften en waaraan niet door bestaande oplossingen kan worden voldaan."

Article 2.126c:

1. "Bij toepassing van de procedure van het innovatiepartnerschap onderhandelt de aanbestedende dienst met de inschrijvers over hun eerste en over elke daaropvolgende inschrijving, met uitzondering van de definitieve inschrijving, om de inhoud ervan te verbeteren.
2. De aanbestedende dienst onderhandelt niet met de inschrijvers over de gunningscriteria en de in artikel 2.126b, derde lid, bedoelde minimumeisen.
3. De aanbestedende dienst waarborgt tijdens de onderhandelingen de gelijke behandeling van alle inschrijvers en verstrekt geen informatie die een of meer inschrijvers kan bevoordelen boven andere.
4. In afwijking van artikel 2.57 verstrekt de aanbestedende dienst vertrouwelijke inlichtingen die een gegadigde of inschrijver met wie hij onderhandelt aan hem heeft verstrekt, slechts aan de andere deelnemers, indien de desbetreffende deelnemer daarvoor toestemming heeft gegeven. In het verzoek om toestemming van de desbetreffende deelnemer geeft de aanbestedende dienst aan welke specifieke inlichtingen hij wil verstrekken.
5. De aanbestedende dienst stelt alle inschrijvers wier inschrijving na afronding van een fase als bedoeld in artikel 2.126b, vijfde lid, niet is afgewezen, schriftelijk in kennis van andere wijzigingen in de technische specificaties of andere aanbestedingsstukken dan die waarbij de minimumeisen worden vastgesteld, waarna de inschrijvers voldoende tijd krijgen om hun inschrijvingen naar aanleiding van deze wijzigingen, indien nodig, aan te passen en opnieuw in te dienen."

Article 2.126d:

1. "De aanbestedende dienst kan het innovatiepartnerschap met één partner sluiten dan wel met verschillende partners die afzonderlijke onderzoeks- en ontwikkelingsactiviteiten voor hun rekening nemen.

2. De aanbestedende dienst structureert het innovatiepartnerschap in opeenvolgende fasen die de reeks stappen in het onderzoeks- en innovatieproces volgen, hetgeen de fabricage van goederen, de verlening van diensten of de voltooiing van werken kan omvatten.
3. In het innovatiepartnerschap worden tussentijdse, door de partners te bereiken doelen bepaald, en wordt voorzien in betaling van de vergoeding in passende termijnen.
4. De aanbestedende dienst ziet erop toe dat de structuur van het partnerschap en in het bijzonder de duur en de waarde van de verschillende fasen een afspiegeling zijn van de innovatiegraad van de voorgestelde oplossing en van de reeks van onderzoeks- en innovatieactiviteiten die vereist zijn voor de ontwikkeling van een innovatieve en nog niet op de markt beschikbare oplossing, waarbij de geraamde waarde van de levering, de dienst of het werk niet onevenredig mag zijn in verhouding tot de investering voor de ontwikkeling ervan.
5. In afwijking van artikel 2.57 verstrekt de aanbestedende dienst bij een innovatiepartnerschap met meer partners, aan hem voorgestelde oplossingen of andere door een partner in het kader van het partnerschap meegedeelde vertrouwelijke inlichtingen, slechts aan andere partners, indien de desbetreffende partner daarvoor toestemming heeft gegeven. In het verzoek om toestemming van de desbetreffende partner geeft de aanbestedende dienst aan welke specifieke inlichtingen hij wil verstrekken.
6. Indien de aanbestedende dienst na elke fase het innovatiepartnerschap wil kunnen beëindigen of, bij een innovatiepartnerschap met verschillende partners, het aantal partners wil kunnen verminderen door individuele opdrachten in te trekken, vermeldt hij dat in de aanbestedingsstukken. De aanbestedende dienst vermeldt hierbij tevens de voorwaarden voor beëindiging van het innovatiepartnerschap of de vermindering van het aantal partners.
7. De door de aanbestedende dienst aan te schaffen producten, diensten of werken voldoen aan het door de aanbestedende dienst met de partners afgesproken prestatieniveau en blijven onder de maximumkosten."

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APPENDIX 03: ALLIANCE CONTRACTING

In the alliance model, client and contractor enter into a partnership and function as equals. This creates a significant focus on collaboration. Both client and contractor hold stakes, manage, design and hold risks. Sometimes alliancing is facilitated by the creation of a separate project alliance organisation. In such an organisation, the shared tasks are included in the alliance domain of the alliance contract. The remaining tasks are allocated to either the client or the contractor. This is often facilitated by combining the alliance contract with an integrated contract model. The agreement between the involved parties is generally governed by general terms and conditions for commissions to consultants: The New Rules 2011 (Chao-Duivis et al., 2013, p. 26; Elemans, 2016, pp. 113, 119; PIANOo, 2017a).

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APPENDIX 04: INNOVATION

In chapter 07 was concluded that a contracting authority should determine whether the procured demand is really 'innovative', 'new' or 'significant improved'. This should be done before the publication of the announcement of the assignment for an innovation partnership. Additionally, it was recommended that this contracting authority consults procurement law, policy documents, literature and market parties to ground their decision. The objective of this appendix is to build on this recommendation and provide insight in the complexity of the 'innovation'-concept. The provided information can subsequently be used to determine the innovativeness of the construction-related innovation. Therefore, the following three aspects are discussed: the innovation system in de construction industry, the difference between invention and innovation, and the multiplicity of denominators of innovation.

04.01 Innovation system in the construction industry

Arnoldussen (2017, pp. 15–18) and Hobday (2000) identify the construction industry as a complex combination and connection of tailor made, high cost components. The complexity of the connection is caused by:

- The combination of design, development and integration which can lead to unexpected situations during production.
- The high number of different components and materials.
- The broad level of required knowledge and competences.
- The high number of companies or departments which need to collaborate.
- The number of design possibilities for the intended project objectives.

Construction projects are custom-built to a client's bespoke needs. This unique and one-off character (not by definition innovative) and the accompanying economic life-cycle of the requirements, implies that production is carried out on small scale. Due to the lack of mass production, innovation in the construction industry often evolves incrementally and continues after the delivery date of the demand.

Because economic operators compete to get projects awarded and the collaboration is bound to project level [meaning that partners in project A, can be competitors in project B] innovation decisions remain less clear-cut. Leading to the urge of suppliers to keep specific knowledge to themselves. Despite this protective attitude, Arnoldussen et al. (2017) and Hobday (2000) mention that collaboration between client and contractor is a prerequisite to enable innovation in complex products and systems. This is needed because:

- There is not a single business which has total control over the complete project.
- Involved individuals should have a thorough knowledge and experience.
- Suppliers should have a clear idea of the opportunities, wishes and demands of clients and users.
- There should be room to consider unspoken or unconscious (complementary) knowledge of individuals and teams.

04.02 Invention versus innovation

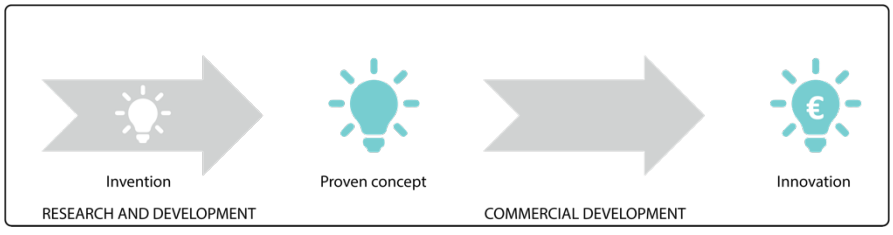

figure 29: invention, proven concept and innovation

In innovation literature the terms 'innovation' and 'invention' are differentiated [table 16][8]. Based on this literature, it is concluded that an innovation mainly differs from an invention regarding its economic value and its diffusion level. In the book 'public procurement for innovation', Edquist (2015, p. 3) explains the distinction between invention and innovation by means of a prototype: "A prototype is a model that functions under certain conditions. It is not produced in a large series, not commercialised and its commercial viability is not proven. Hence, a tested prototype is not an innovation." Practically said, an invention could appear somewhere in an R&D process and it should be differentiated from a proven concept and an innovation. As argued in §03.01.01, the innovation partnership can be used for the whole process as illustrated in figure 29.

table 16: invention versus innovation

	Invention	Innovation
Novelty	Novel compared to existing know-how.	Novel to the creating institution. Opportunity for new market and/or service.
Design	Detailed design of a profit model, network, structure, process, product performance, product system, service, channel, brand or costumer engagement.	Does not require a detailed design of a profit model, network, structure, process, product performance, product system, service, channel, brand or costumer engagement.
Application	Laboratory level	Adds economic value to invention and diffuses to other parties beyond the discoverers.
Process	Research	Research and development, and commercial development.
Link	An invention is not a proven concept or an innovation.	An innovation may involve an invention or a proven concept.

04.03 Multiplicity of innovation denominators

In innovation literature, six innovation-denominators are differentiated (Baregheh et al., 2009, pp. 1331, 1332): (1) the nature of innovation, (2) the social context of innovation, (3) the type of innovation, (4) the stages of innovation, (5) the means of innovation, and (6) the aim of innovation. In the following sections, the subdivision of these denominators [figure 30] is thematically discussed.

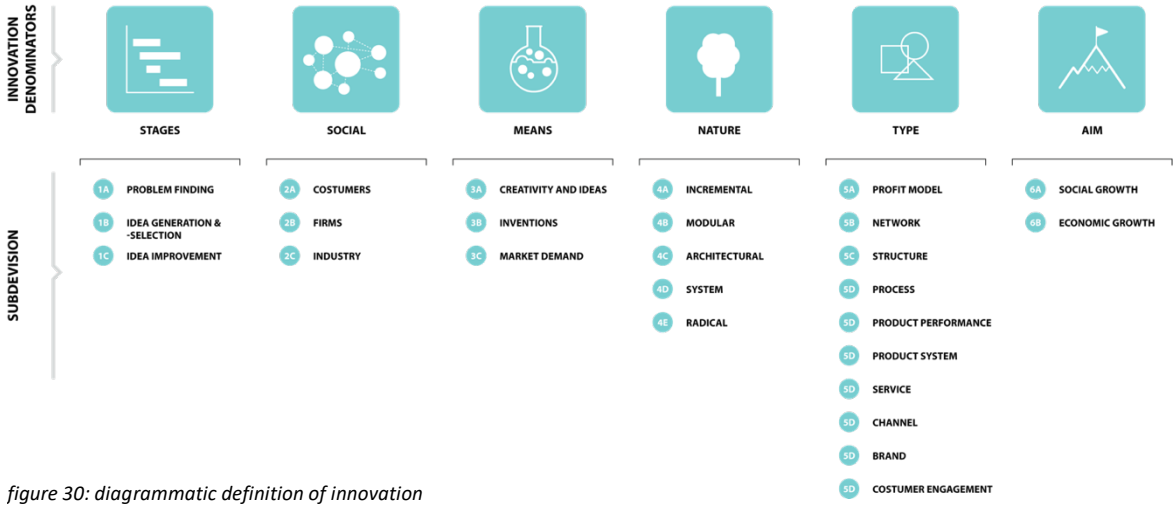

figure 30: diagrammatic definition of innovation

[8] Table 17 is based on research of Berkun (2007, p. 45), Edquist et al (2015, pp. 1–3), Gann (2000, p. 54), Garcia & Calatone (2002, p. 112), Hekkert & Van Dijk (2011, p. 20), Keeley et al. (2013, p. 22) and Slaughter (1998, p. 226).

04.03.01 The nature of innovation

In innovation literature, the terminology of 'type' and 'nature' of innovation are intermingled. However, definition-wise there is a difference between the two (Baregheh et al., 2009). In this section the 'nature' of innovation is discussed. The 'types' of innovation are shown in §04.03.05.

The nature of innovation refers to the form of innovation as in something new, changed or improved (Baregheh et al., 2009, p. 1332; Slaughter, 1998). As indicated in chapter 04, Slaughter (1998) differentiates five of these natures[9] for the construction industry [figure 31]. The presence of this degree of innovativeness is also recognized in other literature about construction-related innovation (Gann, 2000, p. 206; Pries & Dorée, 2005, p. 562) and in Dutch construction practice (Rijkswaterstaat, 2017, p. 7). An overview of the characteristics of these five 'natures' of innovation, as described by Slaughter (1998), is provided in table 17 on the next page.

Based on this overview it, can be concluded that the innovation partnership does discriminate regarding the nature of innovation. The procedure can be applied for the development of something 'new' or 'significant improved' [note the word 'significant']. This means that the innovation partnership should not be applied for procuring small changes such as incremental innovations.

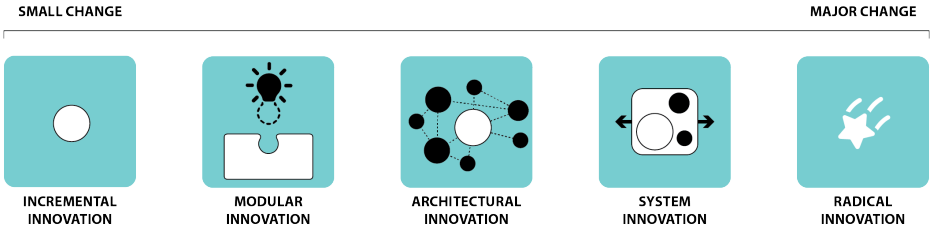

figure 31: nature of innovation

A final note regarding the used terminology: The term 'type of innovation' is deemed easier to use in practice than the term 'nature of innovation'. Therefore, the term 'type' is used in the main text of this report. As will become apparent in §04.03.05, it is more practical to indicate the 'types' of innovation with their actual appearance.

04.03.02 Social context of innovation

The *social context of innovation* "refers to any social entity, system or group of people involved in the innovation process or environmental factors affecting it (Baregheh et al., 2009, p. 1332)" (Edquist et al., 2015, pp. 1–3). This social context can be divided in three perspectives: *costumers, industry and firm* (Garcia & Calantone, 2002). This division is based on the differentiation between micro-[10] and macro[11] level and innovativeness[12] of technology and marketing [figure 32]. Comparison of this subdivision with the description of the innovation partnership highlights that the procedure can only be used when the demanded product, service or works is *not yet available on the market* (Dutch procurement law 2012 (2016) Art 2.31a). This implies that novelty from the perspective of the

[9] Note that Slaughter uses the word 'type', but means the same as Baregheh (2009) indicates with 'nature'.
[10] "From a *micro perspective* 'innovativeness' is the capacity of a new innovation to influence the firm's existing marketing resources, technological resources, skills, knowledge, capabilities, or strategy (Garcia & Calantone, 2002, p. 113)."
[11] "From a *macro perspective* 'innovativeness' is the capacity of a new innovation to create a paradigm shift in the science and technology and/or market structure in an industry (Garcia & Calantone, 2002, p. 113)."
[12] *Innovativeness* in this figure is defined as: "a measure of the potential discontinuity a product (process or service) can generate in the marketing and/or technological process (Garcia & Calantone, 2002, p. 113)."

table 17: characteristics of the different 'natures' of innovation

'Natures' of innovation	Incremental	Modular	Architectural	System	Radical
Change of concept	Minor. Adaption, refinement and improvement of something existent.	Significant.	Minor.	Integration of multiple innovations.	Major. Embodies something new that results in a new market infrastructure.
Change of interaction with other component and system	Negligible. Reinforces dominance of established firm.	Negligible.	Major.	Major. Integration of multiple innovations.	Major. Existing linkages and interactions may be irrelevant.
Knowledge	Based on current knowledge and experience in companies themselves. Considerable skill and ingenuity.	Organisation with control or responsibility regarding innovation.	Must understand the linkages.	Integration of multiple innovations.	Breakthrough in science, technology and/or engineering research.
Frequency (in the built environment	Constantly.			High frequency.	Rare.
Impact	Predictable within a fairly narrow range. Very significant economic consequences over time.				Unpredictable. Creates dissonance for established firms regarding their knowledge and expertise. Can be the basis for the successful entry of new forms of or even the redefinition of an industry.
Source	Within technically competent organisation.	Within organisation with higher technical competency.	Organisations which do not have a vested interest in maintaining the existing linkages but have enough knowledge and control over the affected components and systems.	Combination of modular and architectural innovation combined with organisational authority to ensure collaboration and integration.	Outside existing industry.
Example of this innovation	Efficiency of solar panels.	Concrete 3D-printer.	Integration of solar panels in products (WATTLAB, 2018).	Disassembly of products and systems in a circular construction (Van Vliet, 2018).	Introduction of structural steel.

costumer, firm or industry are not of influence for the application of the innovation partnership. After all, cross-implementation does not mean that the procured demand is new to the market. Therefore, cross-firm or cross-industry implantation through an innovation partnership is only possible when the innovation is subject to significant alteration [§04.03.01].

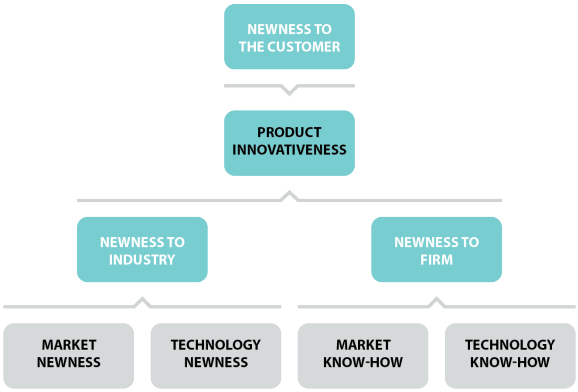

figure 32: operationalization of innovativeness

04.03.03 The aim of innovation

The *aim of innovation* is defined as "the overall result that the organisations want to achieve through innovation (Baregheh et al., 2009, p. 1332)" (Gann, 2000, p. 211). In Directive 2014/24/EU Art 2 par 22 the objective of the introduction of the innovation partnership is explained as: "the purpose of helping to solve societal challenges or to support the Europe 2020 strategy for smart, sustainable and inclusive growth." However, this objective is not restrictive for the application of the innovation partnership. Therefore, the procedure can be applied for whatever innovation aim is deemed suitable.

04.03.04 The means of innovation

The *means of innovation* are the resources which are required for innovation: creativity, financial and technology (Baregheh et al., 2009, p. 1332). Using a procurement procedure, implies that the involved procurer does not (yet) possess (all) the resources, which are necessary to establish the demanded outcomes. The innovation partnership facilitates the funnelling process towards the partner(s) with the best suitable means.

04.03.05 Types of innovation

Keeley et al. (2013) differentiates ten *types*[13] *of innovation.* An overview of these ten types is provided in table 18*,* on the next page. It can be assumed that the innovation partnership can be applied for all these ten types of innovation.

04.03.06 Stages of innovation

The term '*stages of innovation*' "refers to all the steps taken during an innovation process (Baregheh et al., 2009, p. 1332)." These steps and stages are further discussed in chapter 08 of the thesis report.

[13] *Note: Do not confuse between the 'type' and 'nature' of innovation. This is further explained in §04.03.01.*

table 18: ten types of innovation

Types of innovation	Explanation	Elaboration	Example
Profit model:	"How to make money"	"Convert a firm's offerings and other sources of value into cash. […] Innovative profit models often challenge an industries tired old assumptions about what to offer, what to charge or how to collect revenues (2013, p. 36)."	Transactional model (generally applied in the construction industry), renting model, finance lease, operating lease, licence, subscription, freemium, pay-per-[…], cascading, sharing of assets, consumption model, lifetime extension (Keeley et al., 2013, p. 36; Kieboom, 2018, p. 43).
Network:	"How to connect with others to create value"	"Provide a way for firms to take advantage of other companies' processes, technologies, offerings, channels and brands. […] Network innovations help executive to share risk in developing new offers and ventures (2013, p. 41)."	Shared use of telecom infrastructure. Telecom provider Telfort makes use of the KPN Network.
Structure:	"How to organise and align your talent and assets"	"Are focused on organising company assets (hard, human or intangible) in unique ways that create value. […] Structure innovations help attract talent to the organisation by creating supremely productive working environments or fostering a level of performance that competitors cannot match (2013, p. 45)."	Until 2011 Southwest Airlines flew only one kind of airplane: the Boeing 737. Van Wijnen is a decentralised national construction company (Van Wijnen, 2018).
Process:	"How to use signature or superior methods to do your work"	"The activities and operations that produce an enterprise's primary offerings. […] Process innovations often form the core competency of an enterprise and may include patented proprietary approaches that yield advantage of years or even decades (2013, p. 49)."	Lean production systems (Toyota). Best Value Procurement, DBFMO contracts.
Product performance:	"How to develop distinguishing features and functionality"	Addresses "the value, features, and quality of a company's offering. This type of innovation involves bot entirely new products as well as updates and line extensions that add substantial value (2013, p. 53)."	New products and updated products such as: iPhone 1 - iPhone Xs and solar panels.
Product system:	"How to create complementary products and services"	"How individual products and services connect or bundle together to create a robust and scalable system. […] Product systems help to build ecosystems that captivate and delight costumers and defend against competitors (2013, p. 57)."	Adobe programs, Microsoft office programs. Tesla and Tesla Supercharger-charging points.
Service:	"How to support and amplify the value of your offerings"	"Ensure and enhance the utility, performance and apparent value of an offering. […] They elevate even bland and average products into compelling experiences that costumers come back for again and again (2013, p. 61)."	Online, telephonic or physical costumer support.
Channel:	"How to deliver your offerings to	"All the ways that you connect your company's offerings with costumers and users. […] The goal is to ensure that users	Kindle's closed wireless network to purchase and download e-books.

	costumers and users"	can buy what they want, when and how they want it, with minimal friction and cost and maximum delight (2013, p. 65)."	
Brand:	"How to represent your offerings and business"	"Help to ensure that customers and users recognize, remember, and prefer the offering to those of competitors or substitutes. […] Brand innovations can transfer commodities into prized products, and confer meaning, intent and value to the offerings and enterprise (2013, p. 69)."	Virgin, Red Bull, Apple.
Costumer engagement:	"How to foster compelling interactions"	"Understanding of the deep-seated aspirations of customers and users, and those insights to develop meaningful connections between them and the company (2013, p. 73)."	World of Warcraft (computer game).

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APPENDIX 05: CREATIVE EQUITY SCAN

Design firm VanBerlo, Eindhoven University of Technology and TIAS Business School collaboratively developed a creative equity scan to measure the innovation potential of a company (Versteeg et al., 2018). The scan exists of four drivers and eighteen metrics, as enumerated below.
The creative equity scan is currently tested in practice. As discussed in chapter 14, it is recommended to research the suitability of this scan for application in the context of the built environment.

table 19: creative equity scan

Embeddedness	Innovation pioneers	Climate	Resources
▪ Organistional proximity ▪ Cognitive proximity ▪ Institutional proximity ▪ Social proximity	▪ Innovative behaviour ▪ Proactive behaviour ▪ Risktaking behaviour	▪ Support for initiative ▪ Supervisory encouragement ▪ Reflexivity ▪ Vision ▪ Challenge ▪ Cohesion & involvement ▪ Psychological safety	▪ Financial resources ▪ Physical resources ▪ Organistional resources ▪ Human resources

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APPENDIX 06: CHALLENGES IN AN INNOVATION PROCESS

In §08.01 the challenges in an innovation process are discussed. This appendix contains clarification for the conclusions as presented in that section.

Berkun (2007, pp. 44–46) identified eight challenges for innovation:

1. Find an idea;
2. Develop a solution;
3. Find sponsorship and funding;
4. Reproduction (scaling up);
5. Reach your potential costumer (marketing and communication);
6. Beat your competitors (succeeded innovation);
7. Timing (pick the right moment);
8. Keep the lights on (meet your financial obligations).

As argued in §08.01, these eight challenges should be handled in the process set-up of the innovation partnership. Therefore, the eight challenges are compared with the characteristics of the procedure. In table 20, a detailed overview of the arguments per challenge is presented. This table shows that the first two challenges must be facilitated in the innovation partnership. The other six challenges [step 3 to 8] are inherent to participation in a procurement process.
To conclude, in terms of innovation management the challenges for innovation seem to be covered in the set-up of the innovation partnership. However, the suitability of a business case can only be determined after an idea evolved into a (developed) (innovative) solution.

table 20: Berkun's challenges for innovation versus the innovation partnership

[#]	Challenges	Characteristics of the innovation partnership
1	Find an idea	The innovation partnership provides the flexibility to fit the innovation partnership to the sequences of steps as required for "a research and innovation process" (Directive 2014/24/EU Art 31 par 2; Dutch procurement law Art 2.126d par 1).
2	Develop a solution	The innovation partnership provides the flexibility to fit the innovation partnership to the sequences of steps as required for "a research and innovation process" (Directive 2014/24/EU Art 31 par 2; Dutch procurement law Art 2.126d par 1).
3	Find sponsorship and funding	Application of the innovation partnership is inherent to remuneration of (parts) of the costs made by the 'partners' (Directive 2014/24/EU Art 31 par 2; Dutch procurement law Art 2.126d par 3).
4	Reproduction *(Scaling up)*	Commercialisation of the developed innovation is inherent to the possibilities the innovation partnership facilitates (Directive 2014/24/EU Art 31 par 2; Dutch procurement law Art 2.126d par 2).
5	Reach your potential costumer *(Marketing and communication)*	Reaching the costumers demand is, or should be, inherent to participating in the procurement procedure of the innovation partnership (Directive 2014/24/EU Art 31 par 1; Dutch procurement law Art 2.126d par 2).
6	Beat your competitors *(Succeeded innovation)*	Legitimate use of the innovation partnership is inherent to the absence of suitable answers for the contracting authority's ambitions in the current market. Participating in a procurement process is inherent to competition and funnelling.

		Moreover, there is always a chance that economic operators, not participating in the innovation partnership, come up with solutions for the procured demand. The innovation partnership facilitates in this possibility of occurrence through a termination strategy for the 'partnership' (Directive 2014/24/EU Art 31 par 2; Dutch procurement law Art 2.126d par 6).
7	Timing *(Pick the right moment)*	Use of the innovation partnership is inherent to a suitable timing for the contacting authority. Meaning: there is a reimbursement guarantee for (a part of) the R&D process and a purchasing intention for the resulting innovation (Directive 2014/24/EU Art 31 par 1; Dutch procurement law Art 2.126d par 3, par 7).
8	Keep the lights on *(Meet financial obligations)*	The suitability of the business case in the innovation partnership should enable freedom for innovation (Directive 2014/24/EU Art 31 par 1; Dutch procurement law Art 2.126d par 3, par 7).

APPENDIX 07: LIST OF MEETINGS AND INTERVIEWEES

Note: In the following tables some credentials are masked because of confidentiality agreements with these specific individuals. These credentials are indicated with [-] and are known to the members of the graduation committee.

Explorative meetings

Date	Title	Organisation	Speaker
16.05.2017	Information meeting 'innovative' procurement	Wouter Roemaat and -	-
18.05.2017	Knowledge table innovation partnership		-
17.01.2018	Market consultation	Avans university of applied sciences	-
05.07.2018 & 06.07.2018	IFKAD 2018		-

Explorative conversations

Date	Name	Category	On behalf of	Employed at
Frequent	Wouter Roemaat	Advisor	Graduation committee	Alba Concepts
Frequent in 2017	Gerben Hofmeijer	Advisor	Graduation thesis	AT Osborne
21.05.2017 12.07.2017	-	Contractor	-	-
08.06.2017	-	Advisor	-	-
19.04.2018	-	Contract authority	-	-
28.04.2018	-	Contractor	-	-
07.06.2018	-	Contract authority	-	-

Explorative events and lectures

Date	Event	Speaker
16.02.2018	Captain Co-Creation Event	Claudia Reinier Peter Clausman Alfons van Marrewijk
19.04.2018	Building Holland	
19.04.2018	Captain Co-Creation Lecture	Peter Clausman

Test interviews

Date	Interviewee	Category	Function	Employed at
29.08.2017	Woud Jansen	Advisor	Partner, project manager	Alba Concepts
31.08.2017	Leonie Eggen	Advisor	Project manager	Alba Concepts

Interviews

Date	Interviewee(s)	Category	Function	Case	Employed at
05.09.2017	-	Lawyer	Senior Lawyer	-	-
08.09.2017	-	Lawyer	Managing Associate	-	-
12.09.2017	-	Lawyer	Lawyer, senior associate	-	-
11.09.2017	-	Lawyer / advisor	Lawyer	-	-
21.09.2017	-	Lawyer	Lawyer Procurement and construction law	-	-
12.09.2017	-	Advisor	Project and process management	-	-
27.09.2017	-	Advisor	Senior manager	-	-
02.10.2017	-	Advisor	Consultant / partner	-	-
03.10.2017	-	Advisor	Consultant / partner	-	-
16.10.2017	-	Advisor	Consultant / Sustainability Creator	-	-
31.10.2017	-	Advisor	Senior Strategist Innovation, Business Development & Strategy Director	-	-
14.09.2017	-	Contracting authority	Chief procurement officer	-	-
20.09.2017	-	Contracting authority	Project manager	-	-
22.09.2017	-	Contracting authority	Senior advisor market and innovation	-	-
25.09.2017	-	Contracting authority	Senior purchaser	-	-
26.09.2017	-	Contracting authority	Innovation advisor	-	-
27.09.2017	-	Contracting authority	Senior purchaser	-	-
28.09.2017	-	Contracting authority, Advisor	Policy officer accommodations	-	-
11.10.2017	-	Contracting authority	Technical manager	-	-
11.10.2017	-		Senior advisor procurement and contracting	-	-
20.09.2017	-	Contractor	Director business development	-	-

25.09.2017	-	Contractor	Sustainability and innovation	-	-
03.10.2017	-	Contractor	Tendermanager Design & Build	-	-
12.10.2017	-	Contractor / lawyer	Real estate lawyer, Manager business development	-	-
17.10.2017	-	Contractor	Director Building Tenders, Manager M&E / Tender manager	-	-
24.10.2017	-	Contractor	Tender manager	-	-

Applying and testing of content of the guide

Date	Name(s)	Category	Function	Case	Employed at
Feb – Aug 2018	Pim de Valk Wouter Roemaat	Advisor	Project managers	Project DOEN (Arnhem), Kamp C (Antwerpen)	Alba Concepts

Test sessions validation

Date	Name	Category	Function	Employed at
17.05.2018	Pim de Valk	Advisor	Project manager	Alba Concepts
20.05.2018	Pim de Valk	Advisor	Project manager	Alba Concepts

Focus group

Date	Name	Category	Function	Employed at
22.05.2018	-	Lawyer	Lawyer	-
22.05.2018	-	Advisor	Consultant	-
22.05.2018	-	Contractor	Tender manager	-
22.05.2018	-	Advisor[14]	Project manager	-

Additional clarifying conversations

Date	Name	Category	Function	Employed at
26.06.2018 & 31.07.2018	-	Advisor / lawyer	-	-

Validation of the clarity of the creative process in the draft guide(s)

Date	Name	Category	Function	Employed at
11.06.2018	-	Researcher & lecturer	Managing partner	-
11.06.2018 & 04.09.2018	-	Lecturer	Partner	-

[14] For this validation session this advisor is operating from the perspective of a contracting authority.

Validation of the feasibility of the procurement process in the draft guide(s)

Date	Name	Category	Function	Employed at
11.06.2018	Team Alba Concepts	Advisor	Project managers and consultants	Alba Concepts
10.07.2018	Pim de Valk	Advisor	Project manager	Alba Concepts
01.08.2018	Jochem de Vos	Advisor	Consultant	Alba Concepts
08.08.2018	Wouter Roemaat	Advisor, graduation committee	Partner, project manager	Alba Concepts
09.08.2018	Elaine Kieboom	Advisor	Consultant	Alba Concepts
10.08.2018	Daan Cornelissen	Advisor	Consultant	Dutch Process Innovators
23.08.2018	Woud Jansen	Advisor	Partner, project manager	Alba Concepts
27.08.2018	Jim Teunizen	Advisor	Partner, consultant	Alba Concepts
19.09.2018	Team Alba Concepts	Advisor	Project managers and consultants	Alba Concepts

APPENDIX 08: INTERIEW BREEFING

Gespreksleidraad voor onderzoek naar procesontwerp van het innovatiepartnerschap

Geachte heer / mevrouw [*achternaam*], beste [*voornaam*],

Middels deze brief stuur ik u een korte introductie aangaande wat u kunt verwachten tijdens het interview.
Dit gesprek wordt gehouden in het kader van een afstudeeronderzoek naar het innovatiepartnerschap. Het onderzoek wordt gedaan bij de TU Delft en Alba Concepts.

Doel en scope van het onderzoek
De uitkomst van dit afstudeeronderzoek beoogt handvatten te bieden voor aanbestedende partijen om, wanneer zij gebruik maken van het innovatiepartnerschap, hun uitvraag zo vorm te geven, dat hun doelen ook echt behaald worden. Dit onderzoek richt zich op projecten in de bouw en vastgoedsector.

Het innovatiepartnerschap
Op 1 juli 2016 is er een nieuwe procedure geïntroduceerd in het Nederlands en Europees aanbestedingsrecht: de procedure van het innovatiepartnerschap.
Aanbestedende partijen kunnen het innovatiepartnerschap gebruiken wanneer er behoefte is aan de ontwikkeling van een innovatief product of dienst of innovatieve werken, waarbij de aanbestedende dienst zelf geen antwoord weet op de vraag en waarvoor in de markt nog geen toereikende oplossing biedt (ARW 2016). Het verschil met de mededingingsprocedure met onderhandeling, is tweeledig:
1. De omschrijving van het beoogde resultaat is zeer abstract;
2. Het ontwikkeltraject na gunning, maakt deel uit van de aanbestedingsprocedure;

Opbouw interview
Het interview is als volgt opgebouwd: Na een korte kennismaking zal ik het onderzoek kort toelichten. Ik introduceer de procedure van het innovatiepartnerschap en maak de verschillen duidelijk met andere procedures door middel van een procesillustratie. Vervolgens wil ik u in het gesprek vragen naar uw beelden bij een procesontwerp voor het innovatiepartnerschap bij verschillende soorten innovaties. Dit zal ik doen in drie stappen.

1. **Verificatie van soorten innovatie binnen de bouw en vastgoedsector;**

In de literatuur worden vier soorten innovatie geïdentificeerd. (Er wordt een uitdraai van de soorten innovatie meegenomen tijdens het interview).

- Is de respondent het eens met deze indeling?
- Heeft de classificatie van diensten, producten en werken hier invloed op? Zo ja, hoe? Kan je een gebouw als een service zien binnen deze classificatie?
- Voor welke soorten innovatie zou de respondent het innovatiepartnerschap gebruiken?
- Wat is de meest radicale innovatie welke de respondent zelf heeft uitgevoerd?

2. **Identificatie en verificatie van juridische parameters die de aanbestedingswet toestaat voor het aanbestedingsproces van het innovatiepartnerschap;**

Volgens de Europese richtlijn, de aanbestedingswet en het aanbestedingsreglement werken, zijn er 25 juridische aspecten die we moeten inrichten wanneer het innovatiepartnerschap wordt gebruikt. De respondent wordt gevraagd de lijst te verifiëren en eventueel juridische aspecten te schrappen of toe te voegen.

3. **Identificatie van de invloed van soorten innovatie op juridische aspecten**

We plaatsen de soorten innovatie en de juridische aspecten in een matrix.
IJkpunt is de omgang van de markt met het huidige aanbestedingslandschap (Richtlijn 2014/24/EU, Herziende aanbestedingswet 2012 (2016), ARW 2016).

- Wat is de invloed van het soort innovatie op het juridisch aspect? (Deelvraag 1 t/m 25).
- Hoe zou het aanbestedingsproces moeten worden ingericht bij een vraag die een van de vier soorten innovatie behoeft? (Deelvraag 1 t/m 25).
- Hoe zou de respondent de uitvraag formuleren als het gaat om # innovatie? (Deelvraag 26).
- Zijn er voor # innovatie problemen waar de respondent tegen aan denkt te lopen bij de inrichting van het innovatieproces?
- Zijn er problemen waar de respondent tegen aan denkt te lopen bij het aanbesteden van vraagstukken die innovatie behoeven?

Vertrouwelijkheid van verkregen informatie

Er zal een geluidsopname worden gemaakt van het interview, welke gebruikt zal worden om het interview samen te vatten. Ook zal ik eventueel enkele notities nemen. De samenvatting zal naar u worden opgestuurd ter goedkeuring. De samenvatting van het interview zal, indien u daar geen bezwaar tegen heeft, worden geanonimiseerd en vervolgens vrij toegankelijk worden gepubliceerd. De opname zal na publicatie worden gewist.

Mochten er nog vragen zijn, dan kunt u mij bereiken via onderstaande contactgegevens.

Met vriendelijke groet,

Jesse van der Mieden

APPENDIX 09: INTERVIEW SET-UP

Interviewopzet onderzoek innovatiepartnerschap
Datum:
Geïnterviewde:
Interviewer: Jesse van der Mieden
Locatie:

Administratieve zaken vooraf
Heel fijn dat u tijd wilde maken voor dit interview.

- Ik wil het interview graag opnemen, akkoord?
- Het gesprek is vertrouwelijk.
- Een samenvatting van het interview wordt ter goedkeuring opgestuurd.
- Mag de samenvatting zonder persoonsgegevens worden gepubliceerd?
- Ik zal enkele notities nemen tijdens het interview.
- Het interview wordt in het Nederlands afgenomen.
- Na publicatie van de thesis, word de opname van het interview gewist.
- Mocht er even een pauze nodig zijn, dan is dat prima.
- Heeft u nog vragen voor mij, voordat we het interview starten?

Kennismaking
Ik wil het interview graag starten met enkele introductievragen:
Kunt u uzelf introduceren?
Wat is uw raakvlak met het innovatiepartnerschap?
Opereert aan opdrachtgeverszijde of opdrachtnemerszijde?

Introductie

- Een nieuwe procedure in het Nederlands en Europees aanbestedingsrecht: De procedure van het innovatiepartnerschap.
- De procedure kan gebruikt worden wanneer er nog geen geschikte oplossing voor het probleem aanwezig is op de markt.
- Het verschil met de mededingingsprocedure met onderhandeling is tweeledig:
  1. De omschrijving van het beoogde resultaat is zeer abstract.
  2. Het ontwikkeltraject na gunning, maakt deel uit van de aanbestedingsprocedure.

  - *Bent u het hier mee eens? Of kijkt u anders naar de procedure?*
  - *Wat ziet u als toegevoegde waarde van het innovatiepartnerschap ten opzichte van andere procedures?*

- Gerben Hofmeijer heeft een overzicht gemaakt van procedurele aspecten waaraan gedacht moet worden bij het gebruik van het innovatiepartnerschap.
- Het doel van het onderzoek is het in kaart brengen van handvatten voor opdrachtgevers om de aanbestedingsprocedure van het innovatiepartnerschap zo in te richten dat de samenwerking tussen opdrachtgever en opdrachtnemer kan leiden tot het behalen van de ambitie van de opdrachtgever.
- Ik onderzoek dit in de bouw- en vastgoedsector.
- Ik zal vragen stellen over [punt 1, 2, 3]
- Kunt u met eigen voorbeelden werken in uw antwoorden?

Interviewvragen

1. **Verificatie van soorten innovatie binnen de bouw en vastgoedsector;**
   - Hoe doet innovatie zich voor in de bouw?[15]
   - Is er innovatie nodig in de bouw?[16]
   - In de literatuur worden 4 soorten innovatie geïdentificeerd (zie tabel).
     Is de respondent het eens met deze indeling?
   - Heeft de classificatie van diensten, producten en werken hier invloed op? Zo ja, hoe? Kan je een gebouw als een service zien binnen deze classificatie?
   - Voor welke soorten innovatie zou de respondent het innovatiepartnerschap gebruiken?
   - Wat is de meest radicale innovatie welke de respondent zelf heeft uitgevoerd?

2. **Identificatie en verificatie van juridische parameters die de aanbestedingswet toestaat voor het aanbestedingsproces van het innovatiepartnerschap;**

Volgens de Europese richtlijn, de aanbestedingswet en het aanbestedingsreglement werken, zijn er 28 juridische aspecten die we moeten inrichten. Ontbreekt er nog een (zie lijst)?

3. **Identificatie van de invloed van soorten innovatie op juridische aspecten;**

We plaatsen de soorten innovatie en de juridische aspecten in een matrix.
IJkpunt is de omgang van de markt met het huidige aanbestedingslandschap (Richtlijn 2014/24/EU, Herziende aanbestedingswet 2012 (2016), ARW 2016).

- Wat is de invloed van het soort innovatie op het juridisch aspect? (Deelvraag 1 t/m 27).
- Hoe zou het aanbestedingsproces moeten worden ingericht bij een vraag die een van de vier soorten innovatie behoeft? (Deelvraag 1 t/m 27).
- Hoe zou de respondent de uitvraag formuleren als het gaat om # innovatie? (Deelvraag 28).
- Zijn er voor # innovatie problemen waar de respondent tegen aan denkt te lopen bij de inrichting van het innovatieproces?
- Zijn er problemen waar de respondent tegen aan denkt te lopen bij het aanbesteden van vraagstukken die innovatie behoeven?

Afronding

Ten behoeve van de inrichting van het proces van het innovatiepartnerschap: Zijn er nog zaken die niet zijn besproken zijn, die naar uw idee wel heel belangrijk zijn?
Neemt de procedure iets niet mee, dat wel heel belangrijk is (voor innovatie)?

U kunt binnenkort een samenvatting verwachten van dit interview. Ik hoor graag uw op- of aanmerkingen en aanvullingen hierop. Is het mogelijk de samenvatting binnen een week na ontvangst ter verifiëren? Mocht er bij nader inzien informatie ontbreken, zou ik hierover per telefoon of mail nog mogen contacten?

Heel hartelijk dank voor uw tijd, medewerking en kennis.

[15] Deze vraag was geïntroduceerd vanaf interview nummer 8.
[16] Zie voetnoot 14.

Analyse kader invloed van soorten innovatie op juridische aspecten:

		Kleine aanpassing concept		Grote aanpassing concept	
		Incrementele innovatie *Verbetering van het concept;* *Geen effect op aangrenzende concepten en componenten.* *(Isolatiemateriaal)*	**Architectonische innovatie** *Verbetering van het concept;* *Wel effect op aangrenzende concepten en componenten.* *(PC versus laptop)*	**Modulaire innovatie** *Grote aanpassing van het concept;* *Geen effect op aangrenzende concepten en componenten.* *(Gelzadel)*	**Radicale innovatie** *Grote aanpassing van het concept;* *Wel effect op aangrenzende concepten en componenten.* *(Staalconstructie)*
#	**Juridisch aspect**	…	…	…	…
Selectiefase					
3	Waarop zou je partijen selecteren voor deelname aan het proces van het innovatiepartnerschap, bij # innovatie? (Waar zou opdrachtgever op beoordeeld willen worden) *Metafoor: leuke avond, reis, trouwen*				
1	Op basis van welke uitsluitingsgronden zou de respondent partijen uitsluiten voor deelname aan het innovatiepartnerschap, bij # innovatie? Zijn er uitsluitingsgronden die je zou willen gebruiken, anders dan genoemd in de wet? *(Criminaliteit, fraude, terrorisme, kinderarbeid, etc.)*				
2	Wat voor partijen zijn geschikt, op basis van de geschiktheidseisen, bij # innovatie? Zijn er geschiktheidseisen die je zou willen gebruiken anders dan genoemd in de wet? *(Huidige categorieën zijn: Juridische capaciteiten, financiële middelen, technische bekwaamheid)*				

Procesinrichting nadere selectiefases					
5	Hoeveel selectiedeelfases zou de respondent gebruiken bij # innovatie, om te komen tot een gunning?				
6	Hoeveel onderhandelingsrondes zou de respondent gebruiken bij # innovatie, om te komen tot een gunning?				
7	Wat is idealiter het aantal gegadigde per selectiedeelfase bij # innovatie? *(markt > 5 > 3 > 1)?*				
8	Wat is idealiter het aantal gegadigde per onderhandelingsronde bij # innovatie?				
9, 10	Wat is idealiter de tijdsduur van de selectie (deel)fases bij # innovatie?				
11	Wat is idealiter de tijdsduur tussen onderhandelingsrondes bij # innovatie?				
12	Welke documentatie zou je van partijen willen ontvangen per selectiefase, bij # innovatie?				
13	Wat zijn onderwerpen die je wilt bespreken in een onderhandelingsronde, bij # innovatie?				
14	Hoeveel nota's van inlichtingen zou de respondent gebruiken bij # innovatie, om te komen tot een gunning?				
16	Moeten we specifiek iets regelen met betrekking tot de vergoeding van reken- en tekenkosten bij # innovatie, en zo ja, wat? *(% Opdrachtgever / % opdrachtnemer)*				

Gunningsfase					
17	Op welke criteria zou een opdracht gegund moeten worden bij # innovatie? ▪ *Beste prijs-kwaliteitsverhouding;* ▪ *Laagste kosten berekend op basis van kosteneffectiviteit, zoals de levelscycluskosten;* ▪ *Laagste prijs;*				
18	Welke documentatie zou de gegadigde idealiter leveren voor hun definitieve inschrijving ten behoeve van de gunning? *Visie, missie, presentatie, kansen dossier, risico dossier, plan van aanpak, businessplan, prototype, etc.*				
4, 15, 20	Moet de bezwarentermijn anders worden ingericht dan wettelijk minimaal voorgeschreven?				
19	Aan hoeveel kandidaten wordt idealiter een contract gegund?				
Contracteren					
21	Moeten we specifiek iets regelen met betrekking tot intellectuele eigendomsrechten bij # innovatie, en zo ja, wat? *(Succesvol voltooien / exit clausule)*				
22	Hebben we een specifieke contractvorm nodig bij # innovatie, en zo ja, wat?				
23	Moeten we specifiek iets regelen met betrekking tot contract incentives (bonus/malus) bij # innovatie, en zo ja, wat?				

24	Moeten we specifiek iets regelen met betrekking tot contractduur bij # innovatie, en zo ja, wat?				
25	Hoe zou de respondent omgaan met de (tussentijdse) beëindiging van een contract?				
Commerciële fase					
26	Hoeveel kandidaten zetten idealiter een product op de markt en nemen zo deel aan de commerciële fase?				
27	Moeten we specifiek iets regelen met betrekking tot de winstverdeling tijdens de commerciële fase bij #, en zo ja, wat? *(% Opdrachtgever / % opdrachtnemer)*				
Uitvraag					
28	Hoe zou de respondent de uitvraag formuleren als het gaat om # innovatie? *(abstract / functioneel / technisch / specifiek, …)*				

	Verbetering van het concept	**Grote aanpassing van het concept**
Onveranderde link tussen kernconcept en componenten	**Incrementele innovatie** *Voorbeeld:* *1- De ontwikkeling van de televisie door de jaren heen.* *2- De fysische prestatie van isolatiemateriaal door de jaren heen.* *3- …*	**Modulaire innovatie** *Voorbeeld:* *1- Fietszadel versus gelzadel,* *2- Wapeningsstaalvlechtmachine* *3- …*
Veranderde link tussen kernconcept en componenten	**Architectonische innovatie** *Voorbeeld:* *1- PC versus laptop* *2- Zelfdichtend beton,* *3- …*	**Radicale innovatie** *Voorbeeld:* *1- LAN versus Wifi* *2- Staalconstructies in de bouw* *3- Face changing materials* *4- …*

Juridische aspecten voor de inrichting van het proces van het innovatiepartnerschap

Eerste selectiefase

1. Uitsluitingsgronden
2. Geschiktheidseisen
3. (Kwalitatieve) Selectiecriteria
4. Bezwaartermijn eerste selectiefase

Procesinrichting nadere selectiefases

5. Aantal selectiedeelfases
6. Aantal onderhandelingsrondes
7. Aantal gegadigden in selectiedeelfase
8. Aantal gegadigden in onderhandelingsrondes
9. Tijdsduur van selectiefase
10. Tijdsduur van selectie deelfases
11. Tijdsduur tussen onderhandelingsrondes
12. Gevraagde documentatie in selectiedeelfases
13. Besproken onderwerpen in onderhandelingsrondes
14. Aantal nota's van inlichtingen
15. Bezwaartermijn selectiedeelfases
16. Vergoeding van reken- en tekenkosten in het aanbestedingstraject

Gunningsfase

17. Gunningscriteria
18. Gevraagde documentatie voor inschrijving
19. Aantal partners na gunning
20. Bezwaartermijn gunningsbeslissing

Contracteren

21. Intellectuele-eigendomsrechten
22. Contractvorm
23. Incentives (bonus/malus)
24. Contractduur
25. Mogelijkheden tot beëindigen contract

Commerciële fase

26. Aantal partners in commerciële fase
27. Winstverdeling in commerciële fase

APPENDIX 10: EMPIRICAL QUALITATIVE RESEARCH

10.01 List of procedural aspects that affect the set-up of the innovation partnership.

There are various legal aspects that affect the set-up of the innovation partnership [chapter 04]. During the progress of this research, various lists and categorisations were made of these (key) aspects. In this appendix the development process of these lists is described.

Step 1
The first decomposition is shown in table 21. It is based on the description of the innovation partnership as provided in European and Dutch procurement law (Directive 2014/24/EU Art 31; Dutch procurement law 2012 (2016) Art 1.1, Art 2.31a, §2.3.8.7a). This decomposition consists of 25 aspects which are divided in five categories.

Step 2
This first decomposition was iteratively verified, supplemented and refined by interviewees [§02.05]. This resulted in the list as shown in table 22. It contains 30 aspects which are divided in seven categories.

Step 3
Following the interview process, a second round of literature studies was done [§02.03]. This second round of literature research was conducted to find extra clarification for the data as found in practice. This resulted in a list with 30 aspects which were divided in five categories [table 23].

Step 4
The final list [table 24] resulted from a comparing analysis between (a) the categorisation of empirical data for the suggested set-up of the procedural aspects and (b) the list which resulted from the second round of literature studies. This comparing analysis showed interdependencies and overlap between the indicated procedural aspects. Clustering of this overlapping data showed that the list of procedural aspects could be simplified. This resulted in a list of 14 aspects which are divided in six categories.

table 21: a first decomposition of the innovation partnership

[#]	Legal aspect	Source
1. First selection		
1.1	Exclusion grounds	Directive Art 31 par 6; Dutch procurement law Art 2.31b step b;
1.2	Suitability criteria	Directive Art 31 par 6; Dutch procurement law Art 2.31b step c;
1.3	Selection criteria	Directive Art 31 par 6; Dutch procurement law Art 2.31b step d, Art 2.126b par 7 and 8;
1.4	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
2. Further selection		
2.1	Number of selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, Art 2.16b par 5;
2.2	Number of negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c par 1;
2.3	Number of candidates in selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, Art 2.16b par 5;
2.4	Number of candidates in negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c par 1;
2.5	Duration of selection phase	Directive art 31 par 2, par 7; Dutch procurement law art 2.31b step f, art 2126d par 4;
2.6	Duration of selection sub-phases	Directive Art 31 par 2, par 3, par 5; Dutch procurement law Art 2.31b step f, art 2126d par 4;
2.7	Duration between negotiation rounds	Directive Art 31 par 3, par 4, art 2126d par 4;
2.8	Requested documentation in selection sub-phases	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126b;
2.9	Subjects for discussion in selection in negotiation rounds	Directive Art 31 par 3, par 4; Dutch procurement law Art 2.126c;
2.10	Number of information notices	Directive Art 31 par 2, par 3; Dutch procurement law Art 2.53;
2.11	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
3. Awarding		
3.1	Awarding criteria (best price-quality ratio)	Directive Art 31 par 1; Dutch procurement law Art 2.31b step g, Art 2.126b par 1;
3.2	Requested documentation for subscription	Directive Art 31 par 1; Dutch procurement law Art 2.126b;
3.3	Number of partners after awarding	Directive Art 31 par 1; Dutch procurement law Art 1.1, Art 2.126d;
3.4	Objection term	Directive Art 31 par 1; Dutch procurement law Art 2.127;
3.5	Number of partners in commercial phase	Directive Art 31 par 1, par 2; Dutch procurement law Art 1.1, Art 2.126d;
4. Contracting		
4.1	Intellectual property	Directive Art 31 par 6; Dutch procurement law Art 2.31b step j, Art 2.126b par 6.
4.2	Reimbursement of transaction costs	Directive Art 31 par 2, par 7; Dutch procurement law Art 1.1, Art 2.126d par 3;
4.3	Contract form	Directive Art 31 par 1, 2; Dutch procurement law Art 2.31b step j;
4.4	Termination strategy	Directive Art 31 par 2; Directive Art 73; Dutch procurement law Art 2.126d par 6;
5. Commercialisation		
5.1	Profit distribution in commercial phase	Directive Art 31 par 2 par 7; Dutch procurement law Art 2.31b step j, Art 2.126d par 7;

table 22: verified, supplemented and refined list of legal aspects that affect the set-up of the innovation partnership

[#]	Procedural aspect[55]
0. Pre-procurement *	
0.1	*Challenge formulation **
0.2	Market consultation *
1. First selection	
1.1	Exclusion grounds
1.2	*Suitability criteria*
1.3	*Selection criteria*
1.4	Objection term
2. Process design and further selection	
2.1	Number of selection sub-phases
2.2	Number of negotiation rounds
2.3	Number of candidates in selection sub-phases
2.4	Number of candidates in negotiation rounds
2.5	Duration of selection phase
2.6	Duration of selection sub-phases
2.7	Duration between negotiation rounds
2.8	Requested documentation in selection sub-phases
2.9	*Subjects for discussion in selection in negotiation rounds*
2.10	Number of information notices
2.11	Objection term
2.12	Reimbursement of transaction costs **
3. Awarding phase	
3.1	*Awarding sub-criteria under awarding criterion: best price-quality ratio*
3.2	Requested documentation for subscription
3.3	Number of partners after awarding
3.4	Objection term
4. Contracting	
4.1	Intellectual property
4.2	Confidentiality agreement *
4.3	*Contract form*
4.4	Incentives (bonus/malus) *
4.5	Contract duration *
4.6	*Contract termination strategy (go/no-go moments)*
5. Commercialisation	
5.1	Number of partners in commercial phase **
5.2	Profit distribution in commercial phase
6. Evaluation and publication	

[55] Aspects marked with an * were added to the list. Aspects marked with ** were relocated in the list. No aspects were removed from the list. *Italicised* aspects are considered key for the set-up of the innovation partnership.

table 23: supplemented and refined list of legal aspects that affect the set-up of the innovation partnership

[#]	Aspect	Source
1. Demand formulation		
1.1	Formulate problem definition and project objective	Dutch procurement law §2.3.3.1; Directive Art 31 par 1; Hofmeijer step 2, 5; PIANOo (2016) step 0.
1.2	Market exploration	Dutch procurement law Art 2.31a; Directive Art 31 par 1; Hofmeijer step 2; PIANOo (2016) step 0.
1.3	Choice for joint procurement	Dutch procurement law Art 2.11a; Directive Art 38 par 1; Hofmeijer step 3, PIANOo (2016) step 1.
1.4	Publication of announcement of market consultation	Directive Art 31 par 1; Directive Art 48.
1.5	Market consultation	Dutch procurement law Art 2.25; Directive Art 31 par 1; Directive Art 40, Hofmeijer step 7; PIANOo (2016) step 0, 2.
1.6	Choice for procurement procedure	Dutch procurement law Art 2.31a; Directive Art 31 par 1; Hofmeijer step 1; PIANOo (2016) step 0.
1.7	Choice for number of possible partners	Directive Art 31 par 1; Hofmeijer step 10, 10.1;
1.8	Publication of announcement of assignment	Dutch procurement law Art 2.31b step a; Dutch procurement law §2.3.2.3; Directive Art 2 par 13; Art 31 par 1; Hofmeijer step 4, 6, 7.1, 7.4.
2. Funnelling		
2.1	Exclusion grounds	Dutch procurement law Art 2.31b step b; Directive Art 31 par 6; Hofmerijer step 9; PIANOo (2016) step 0.
2.2	Suitability requirements	Dutch procurement law Art 2.31b step c; Directive Art 31 par 6; Hofmeijer step 9; PIANOo (2016) step 0.
2.3	Selection criteria	Dutch procurement law Art 2.31b step d; Directive Art 31 par 6; Hofmeijer step 7.2, 9; PIANOo (2016) step 0.
2.4	Invitation for first tender	Dutch procurement law Art 2.31b step e; Directive Art 31 par 6.
2.5	Award criterion	Dutch procurement law Art 2.31b step g; Dutch procurement law Art 2.115; Directive Art 31 par 1; Hofmeijer step 7.3, 11, 15, PIANOo (2016) step 0, 3.
2.5.1	Sub-awarding criteria	Dutch procurement law Art 2.115; Directive Art 67; PIANOo (2016) step 1, 2.
2.6	Number of funnelling rounds	Dutch procurement law Art 2.31b step f; Directive Art 31 par 2, par 3, par 5; Hofmeijer step 7.5, 10.3.
2.7	Number of participants in funnelling rounds	Dutch procurement law Art 2.31b step f; Directive Art 31 par 1, par 2, par 3, par 5.
2.8	Duration of funnelling rounds	Dutch procurement law Art 2.31b step f; Directive Art 31 par 2, par 7.
2.9	Discussed subjects	Dutch procurement law Art 2.31b step f; Directive Art 31 par 3; Hofmeijer 7.6.
2.10	Information notices	Dutch procurement law 2.53; Directive Art 31 par 2, par 3.
2.11	Reimbursement of transaction costs	Directive Art 31 par 2, par 7; PIANOo (2016) step 1, 2.
2.12	Objection term	Dutch procurement law 2.127; Directive Art 31 par 1.
2.13	Contract award notices	Dutch procurement law Art 2.31b step l; Directive Art 50, Directive Art 31 par 2; Hofmeijer step 15.
2.14	Number of partners after awarding	Dutch procurement law Art 1.1; Directive Art 31 par 1.
3. Contracting/partnering		
3.1	Intellectual property	Dutch procurement law Art 2.31b step j; Directive Art 31 par 6; Hofmeijer step 16; PIANOo (2016) step 1.
3.2	Contract form	Dutch procurement law Art 2.31b step j; Directive Art 31 par 1, 2; PIANOo (2016) step 1, 3.
3.3	Contract termination strategy	Directive Art 31 par 2; Directive Art 73; Hofmeijer step 10.2, 12, 13; PIANOo (2016) step 1, 2.

4. Commercialisation		
4.1	Number of partners in commercial phase	Directive Art 31 par 1, par 2; PIANOo (2016) step 3.
4.2	Profit distribution in commercial phase	Dutch procurement law Art 2.31b step j; Directive Art 2 par 13, Art 31 par 2 par 7.
5. Evaluation and publication		
5.1	Evaluate the partnership	Hofmeijer step 17.
5.2	Publish learnings and results	Hofmeijer step 18, 19.

table 24: verified, supplemented and refined list of legal aspects that affect the set-up of the innovation partnership

[#]	Procedural aspect[56]
0. Pre-procurement	
0.1	*Challenge formulation*
0.2	Market consultation
1. Funnelling process	
1.1	Number of candidates / tenderers / partners per funnelling round
1.2	Exclusion grounds
1.3	*Suitability criteria*
1.4	*Selection criteria*
1.5	*Awarding sub-criteria*
1.6	*Go/no-go moments*
1.7	Objection term
2. Solution finding process	
2.1	Notes of information
2.2	*Subjects for discussion in the negotiation rounds*
3. Contracting	
3.1	*Contract form*
3.2	*Business case*
3.2.1	Intellectual property
4. Commercialisation	
5. Evaluation and publication	

[56] *Italicised* aspects are considered key for the set-up of the innovation partnership.

10.02 List of subjects for discussion during the innovation partnership

Interviewees suggested various subjects which should be discussed during the pre-procurement phase and the negotiation phase of the procurement process. The suggested subjects are shown in consecutively table 25 and table 26.

table 25: suggested subjects for discussion in the pre-procurement phase

Contractors	
Subject	**Suggested number of times**
Solution direction	2
▪ Scenario's	1
Process design	4
▪ Procurement (selection criteria)	1
▪ Development process	1
Business case	1
▪ Intellectual property	1
Contract form	2
▪ Collaboration	1
▪ Responsibilities	1
Meet each other	1
Mutual expectations	1

Advisors	
Subject	**Suggested number of times**
Process design	3
▪ Procurement process	2
▪ Development process	1
Collaboration form	2
Project objective	1
Solution direction	1
Contract form	1
Business case	1

Lawyers	
Subject	**Suggested number of times**
Solution direction	2
Process design	1
▪ Procurement process (selection, awarding)	1

Contracting authorities	
Subject	**Suggested number of times**
Process design	4
▪ Procurement process (selection- and awarding criteria, do's, don'ts requirements)	3
Solution direction	4
Stated problem	3
▪ Plots	1
Project objective	2
Collaboration	1
▪ Consortium forming	1
Business model	2
▪ Price forming	1
Contract	1

table 26: suggested subjects for discussion in the negotiation phase

Contractors	
Subject	**Suggested number of times**
Solution direction	2
Problem statement	1
Contract	1
Contract termination strategy	1
Process	1
▪ Procurement process (awarding criteria)	
Teams	1
▪ Team composition	1
▪ Characteristics of individuals	1
Knowledgeability	1
Match between teams	1

Advisors	
Subject	**Suggested number of times**
Assessment to test collaboration	1
Plan of action	1
Contract	
▪ Responsibilities	1
▪ Dispute management	1
Business case	
▪ Risk distribution	2
▪ Insurance	1
Match (attitude, people, process)	1
Detailed awarding criteria	1
Solution direction	1

Lawyers	
Subject	**Suggested number of times**
Contract	4
Collaboration	1
Plan of action	1
Process design	
▪ Development process (milestones)	4
▪ Procurement process (awarding criteria)	2
Vision	1
Concept design	
▪ Technical framework	3
Financial framework	2
Problem definition	1

Contracting authorities	
Subject	**Suggested number of times**
Problem definition	2
Contract	2
▪ Escalation lines for disagreement	1
▪ Task distribution	1
Solution direction	4
▪ Design	2
▪ Chances	1
Plan of action	1
▪ Logistics	1
▪ Phasing	1
▪ Quality management	1
▪ Application of methods	1
▪ Analysis	1
Process design	-
▪ Development process	2
Business case	3

▪ Risk distribution	2
▪ Role of contract authority as launching costumer	1
▪ Intellectual property	[#][57]
Collaboration	1

10.03 List of selection criteria and awarding sub-criteria for the innovation partnership

The interviewees proposed various selection criteria and awarding sub-criteria for the funnelling process of the innovation partnership. These criteria are shown in consecutively table 27 and table 28.

table 27: selection criteria

Contractors	
Criteria	**Suggested number of times**
Knowledgeability and knowhow of the company	2
▪ Building methods	1
▪ Technology	2
▪ Logistics	1
▪ Planning	1
▪ Creativity / innovation power	4
▪ Complex buildings	1
▪ Development process	1
▪ Design of innovation	1
▪ Sustainability	1
▪ Quality management	1
▪ Testing and implementing	1
▪ Understanding of the problem	1
Competences of individuals	3
Vision on:	2
▪ Solution design	1
▪ Process design	1
▪ Innovation	1
▪ Theme of solution direction	1
Match (collaboration)	4
Networking capacity to collect knowledge	3

Advisor	
Criteria	**Suggested number of times**
Knowledgeability and knowhow:	-
▪ Innovation power (tech, cult, methods)	5
▪ Development process	7
▪ Design	6
▪ Partnerships	2
▪ Technology	1
Networking capacity	1
▪ Involve stakeholders	1
Match (collaboration on organizational and individual level	6
Competences of individuals	3
▪ Technological	3
▪ Social	3
Vision on:	3
▪ Innovation	1
▪ Development in the sector	1
▪ Business management	1
▪ Organizational culture	1

[57] This subject was proposed by the interviewer.

Networking capacity to collect knowledge	1
Financial stability / capacity	1
Human resources	1

Lawyers	
Criteria	**Suggested number of times**
Knowledgeability and knowhow	4
▪ Innovation capacity	2
▪ Technology	2
▪ Performance	1
▪ Scientific research	1
▪ Integrated contracts	1
Match (collaboration)	1
Vision on:	-
▪ Solution direction	2
▪ Collaboration	1
Competences of individuals	1

Contracting authority	
Criteria	**Suggested number of times**
Knowledgeability and knowhow	9
▪ Project management	4
▪ Creativity / innovation power	11
▪ Collaboration	2
▪ Risk management	1
▪ Contract (variations)	1
▪ Technology	1
▪ Involving stakeholders	1
▪ Business cases	1
▪ Quality management	1
Networking capacity to collect knowledge	4
Match (collaboration and process management)	5
Competences of individuals (in the team) (psych)	4
Financial stability	1
Vision on:	-
▪ Collaboration	1

table 28: awarding sub-criteria

Contractors	
Criteria	**Suggested number of times**
Knowledgeability and expertise	2
▪ Creativity / innovation power	2
Plan of action	2
▪ Development process	2
▪ Collaboration method	1
Competences of individuals	2
▪ Team composition	2
Added value	2
Match (collaboration)	2
Solution direction	1
Business case	1
▪ %profit, costs, general costs	

Advisors	
Criteria	**Suggested number of times**
Knowledgeability and expertise	3
▪ Innovation capacity	3
▪ Methods and tools	1
▪ Project management	1

Match (collaboration)	2
Trust	1
Tone of voice	1
Finances	-
▪ Price	1
▪ Costs	1
Quality	1
▪ (Social) added value	-
Sustainability	1
▪ CO2 reduction	-
Plan of action	1
▪ Process design	-
Vision on:	1
Networking capacity to collect knowledge	1
Competences of individuals	2
Time	1

Lawyers

Criteria	**Suggested number of times**
Solution direction	-
▪ Concept	1
▪ Prototype	2
▪ Design	1
▪ Novelty	1
▪ Added value	1
▪ Sustainability	1
Match (collaboration)	1
Competences of individuals	2
Plan of action	4
Available human resources	1
Vision on:	-
▪ Collaboration	1

Contracting authority

Criteria	**Suggested number of times**
Collaboration	2
Solution direction	2
▪ (Technological) performance	3
▪ Sketch	1
▪ Concept	2
▪ Prototype	1
▪ Vision	1
▪ Design	2
Knowledgeability and experience	3
▪ Innovation capacity	2
Networking capacity to collect knowledge	1
Competences of individuals	1
Financial stability (backers)	1
Plan of action	2
Business case	1
▪ Price	1
▪ Risk management	2
Contract	1
▪ Risk management	2

APPENDIX 11: HAND-OUT VALIDATION SESSION

Note: this hand-out was distributed in six-fold, per participant, to enable answering per identified option.

AFSTUDEERONDERZOEK INNOVATIEPARTNERSCHAP
Validatiesessie, 22.05.2018

Naam panellid: .....

[#]	Probleem-definitie fase		Onderhandelingsfase		Precontractuele fase		Partneren	
01	Probleem-definitie		(a) Idee generatie & -selectie (b) Idee uitwerken				Realisatie	
02	Probleem-definitie		Idee generatie & -selectie		Idee uitwerken		Realisatie	
03	Probleem-definitie		Idee generatie & -selectie				(a) Idee uitwerken (b) Realisatie	
04	Probleem-definitie				(a) Idee generatie & -selectie (b) Idee uitwerken		(a) Realisatie	
05	Probleem-definitie				Idee generatie & -selectie		(a) Idee uitwerken (b) Realisatie	
06	Probleem-definitie	Selectiebesluit		Gunningsbesluit		Overeenkomst	(a) Idee generatie & -selectie (b) Idee uitwerken (c) Realisatie	Commercialiseren

Waar zou je een inschrijver op selecteren?

Selectiecriteria

1.
2.
3.
4.
5.

Op basis van welke criteria zou je de opdracht gunnen?

Gunningscriteria

1.
2.
3.
4.
5.

Wat zou je willen bespreken:

Voor de start van het aanbesteden, tijdens de marktconsultatie?

1.
2.
3.
4.
5.

Tussen selectie en gunning, in de onderhandelingsfase?

1.
2.
3.
4.
5.

Na de gunning, maar voor het tekenen van de partneringsovereenkomst, in de precontractuele fase?

1.
2.
3.
4.
5.

Na de gunning, tijdens de partneringsfase?

1.
2.
3.
4.
5.

APPENDIX 12: GUIDE

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GUIDE

SETTING UP THE INNOVATION PARTNERSHIP

A GUIDE FOR PROJECT MANAGERS OF DUTCH CONTRACTING AUTHORITIES WITH A DEMAND FOR CONSTRUCTION-RELATED INNOVATION

Jesse van der Mieden

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WHY THIS GUIDE

The innovation partnership is new procurement procedure which was introduced in Dutch procurement law on July 1st, 2016. Because of its recent introduction, the experience of Dutch contracting authorities with the innovation partnership is limited. This guide is developed to assist project managers of Dutch contracting authorities with a demand for construction-related innovation, in setting up the innovation partnership. Such that the right partner(s) can be selected for the development process towards the fulfilment of the contracting authority's ambition.

This guide results from the graduation thesis:
Setting up the innovation partnership: Designing a guide for project managers of Dutch contracting authorities with a demand for construction-related innovation.
Those who are interested in background information are invited to read the thesis report.

WHEN TO USE THIS GUIDE

Great that you have found this guide! Wondering if this the guide is suitable for you? This guide can be used when:

- You work for a *contracting authority*.
- You *manage* the procurement process of a *construction-related* demand.
- You think *innovation* might be needed to meet the demand requirements.
- You think that the *innovation partnership* is the best procurement procedure to approach this purchasing challenge.
- You want to know how to *design this procurement process*.

For clarification, the exact meaning of the words in *italic,* is described below:

Contracting authority
Contracting authorities are the parties, which are obliged to procure. Examples of contracting authorities are: the state, regional or local authorities (a province, a municipal authority and a water board) a body governed by public law, or an association formed by one or more such authorities or one or more such bodies governed by public law. Under certain conditions subsidy holders and concessionaires are also obliged to procure. When in doubt, it is recommended to consult Dutch procurement law.

Project managers
Project managers of the Dutch contracting authorities are the professionals responsible for the purchasing process within the contracting authority.

Construction-related
Related to "construction, alteration, repair, maintenance, extension, demolition or dismantling of buildings or structure forming or to form, part of the land (whether permanent or not)"[1].

Innovation
Something 'new' or 'significantly improved' which is not (yet) available on the market[2].

[1] Bouwbesluit 2012, preamble; Housing Grants, Construction and Regeneration Act 1996, section 105 par 1.
[2] This definition is retrieved from Directive 2014/24/EU Art 2 par 22 and Dutch procurement law 2012 (2016) Art 1.1.

The innovation partnership

The innovation partnership is a new procurement procedure, which is introduced by the European Commission to strengthen the innovation chain from research to commercialisation. The main decisive factor for a contracting authority to apply the innovation partnership is when they need an innovative solution for which a satisfactory answer is not (yet) available on the market. To facilitate this purchasing process, the innovation partnership has one **distinctive characteristic**[3]:

> The innovation partnership mandates the development and subsequent large-scale purchase of something 'new' or 'significantly improved' *in a single procedure*.

Furthermore, the description of the procedure includes three 'recommendations' for the design of the procurement process:

- The innovation partnership emphasizes the possibility to facilitate the *development of the procured demand after*, rather than before, *the awarding of a contract*.
- The innovation partnership emphasizes the possibility to *award a contract to multiple parties*.
- The innovation partnership emphasizes the possibility to let the funnelling process of (possible) development partners progress from the procurement-phase into the contracting/partnering-phase, by applying *go/no-go moments*.

Design of the procurement process

The set-up for the procurement process of the innovation partnership exists of a combination of requirements for the development process and requirements for the funnelling process as defined in procurement law [figure 1]. This integration is necessary to facilitate the development and subsequent purchase of something 'new' or 'significantly improved' which cannot be met by solutions already available on the market.

figure 1: process set-up for the innovation partnership

Checklist for using this guide

You are a project manager of a Dutch contracting authority.	✓
You manage the purchasing process of a construction-related demand.	
You *think* you need something 'new' or 'significantly improved' which is not (yet) available on the market.*	

* The 'demand formulation'-process in 'section [B]' of this guide can help to determine whether or not there is a solution which is already available on the market. When this applies, another procurement procedure might be better suitable for purchasing the identified solution.

[3] The legal characteristics of the innovation partnership are thematically discussed in chapter 03 of the thesis report.

READING GUIDE

This guide exists of two sections:

- 'Section [A]: theoretical guide';
- 'Section [B]: practical guide'.

The innovation partnership can be used when a contracting authority voices the demand for the development of something 'new' or 'significantly improved' which cannot be met by solutions already available on the market. To facilitate the fulfilment of this demand, the requirements of the funnelling process, as defined in procurement law, need to be integrated with the requirements for the development process. The guidelines for these two processes are elaborated in 'Section [A]: theoretical guide'.

In 'Section [B]: practical guide', five parallel processes [figure 2] are described which include seventeen actions. These processes and actions reach from the early challenge definition up to the commercialisation of the innovation. A short process description is provided below.

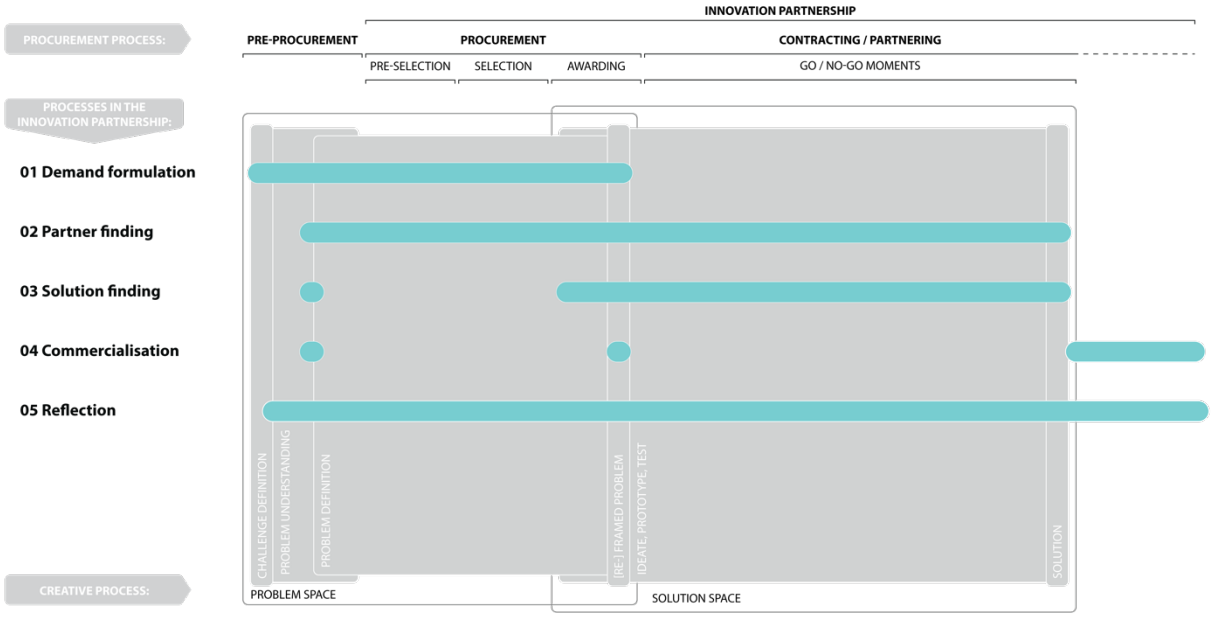

figure 2: visualisation of the guide for the set-up of the innovation partnership for construction-related innovation demands

01. Demand formulation enhances the process from the formulation of the challenge to the [re-] framing of the problem. This process takes place during the pre-procurement and procurement phase.

02. Partner finding enhances the facilitation of the funnelling process of (potential) development partners. The partner finding process is initiated in the pre-procurement phase but mainly take place during procurement and optionally continues in the contracting/partnering-phase.

03. Solution finding enhances the facilitation of the development process of the procured demand. The solution finding process is initiated in the pre-procurement phase, is followed up in the procurement phase, but mainly takes place in the contracting/partnering-phase.

04. Commercialisation enhances the business case aspects which belong to the introduction of the developed solution on the market. It is recommended to discuss the business case aspects during the

pre-procurement phase and in the procurement phase. The commercial development takes place after the ‘solution finding’-phase is completed.

05. Reflection is a prerequisite for the solution finding process. It facilitates both the identification of the (un)suitability of the chosen solution direction and the chosen process approach for participants in, and for future users of, the innovation partnership.

SECTION [A]: THEORETICAL GUIDELINES

The funnelling process

The procurement procedure of the innovation partnership is characterised by three legal phases which demand a linear progress [upper horizontal axis in figure 2]:

- The 'pre-procurement'-phase, in which the procurement process is prepared.
- The 'procurement'-phase, in which the main part of both the funnelling process towards the selection of (a) suitable partner(s) and the start of the development of the procured demand take place.
- The 'partnering'-phase, in which the (further) development of the procured demand and optionally the further funnelling take place.

The 'rules of the game' for procurement are formed by three principles. These principles should safeguard a 'level playing field' for fair competition between all market parties participating in a procurement process. The procurement principles are:

- *Equal treatment and non-discrimination:* bidders, competing in a procurement process, have to be treated on an equal and non-discriminating basis.
- *Transparency:* the procurement process must have a proportionate level of openness. This should be facilitated by opening the market for competition, enabling monitoring, scrutinize decisions and excluding the risk of favouritism and arbitrariness.
- *Proportionality:* contracting authorities have to consider the positive and negative effects of choices they make regarding requirements, conditions and criteria in the procurement process. These choices need to be proportional to the nature and extent of the procured object.

The development process

The development process of the construction-related innovation requires facilitation of a creative process[4]. The characteristics of this creative process are elaborated below.

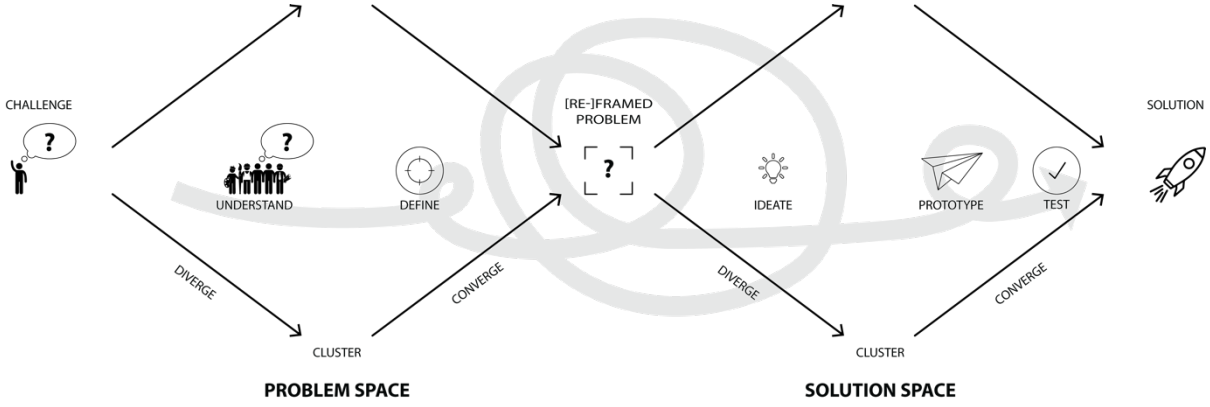

figure 3: a creative process

A creative process enhances a *problem space* and a *solution space* [figure 3]. In these two spaces, three main deliverables can be identified. The development partners should work towards these deliverables via five activities, which are iteratively connected and in which diverging, clustering and converging takes place. The deliverables and activities are:

[4] The demand for creativity in the innovation process is explained in §08.02 of the thesis report.

- Definition of the challenge:
  - Diverging to understand the complexity of the challenge.
  - Clustering and converging to [re-]define or [re-]frame the challenge.
- [Re-]framed problem:
  - Idea generation (diverging) and selection (clustering and converging).
  - Prototyping.
  - Testing.
- Solution.

In this creative process, three parties need to be involved [figure 4]:

- *The problem owner*: the person who feels responsible for solving the indicated problem. In a procurement process for projects in the built environment, this party is known as the contracting authority.
- *A creative facilitator:* the person who is organizing and leading the creative process. In a procurement process for projects in the built environment, this party is known as an advisor. It is important that the facilitator is an independent party; the facilitator should not have a share in the type of - or the business case behind the solution.
- *A resource group:* the individuals who are willing to invest time, knowledge and energy to solve the problem. In a procurement process for projects in the construction, this party is known as a tenderer, economic operator, market party or a candidate. The tenderers can choose to involve independent creative individuals to stimulate creativity in the creative process.

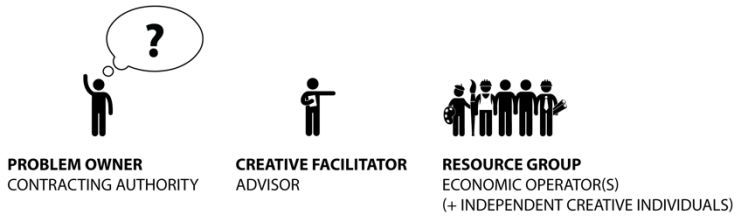

figure 4: three parties which need to be involved in the creative process

A creative process demands unrestricted, rapid and direct interaction and feedback mechanisms. The unrestricted, rapid and direct character of this type of interaction requires safeguarding of a 'creative playing field', existing of five creativity principles. Not safeguarding these principles blocks creativity. The creativity principles are:

On a personal level:

- *Respect:* involved individuals should be able to be sincere and they should be able to be themselves.
- *Trust:* involved individuals should be willing to and dare to share ideas and associations.
- *Discreteness*: involved individuals should be discreet about the outcomes of the creative process towards 'outsiders'.

On a process level:

- *Reciprocity:* the developed ideas belong to everyone participating in the creative process
- *Acceptance:* active involvement of stakeholders eases the acceptance finding process for the suggested ideas. Stakeholders should obtain understanding about the practical added value of the suggested idea to overcome their resistance to change.

SECTION [B]: PRACTICAL GUIDE

01 DEMAND FORMULATION

The objective of the demand formulation phase is to twofold:

- [Re-]frame the defined challenge into the [re-]framed problem.
- And identify whether the construction-related demand can be fulfilled with solutions already available in the market.

These two objectives are facilitated by six steps. The place of these steps in the procurement process is indicated in figure 5. The content of the steps is elaborated below.

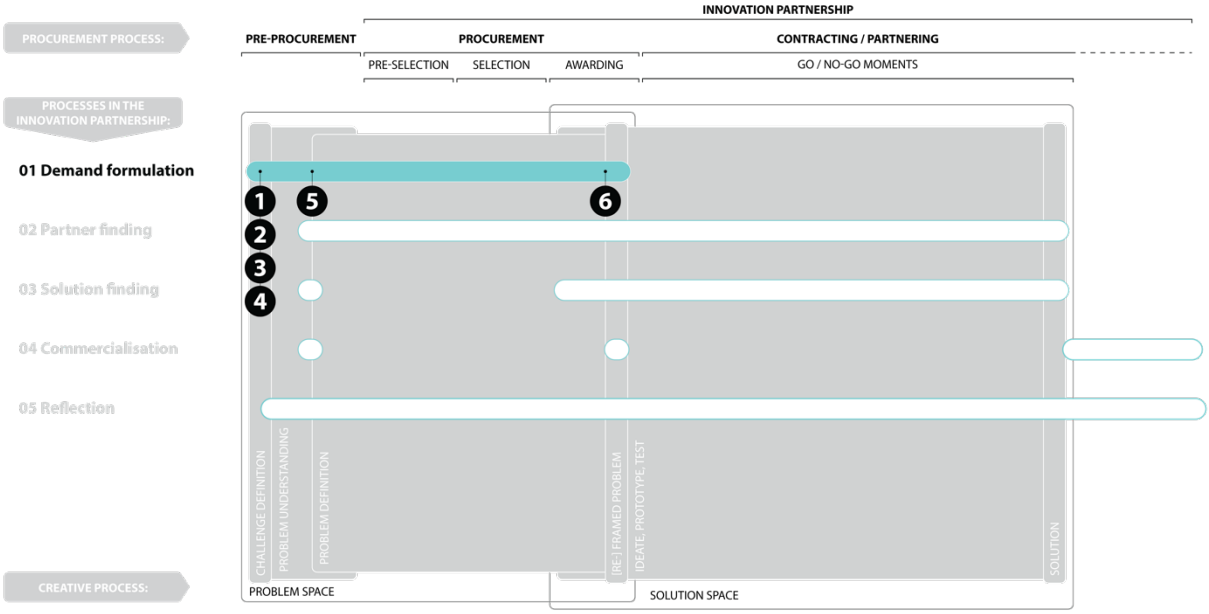

figure 5: steps in the demand formulation process

1 Formulate the challenge

A procurement process starts with the formulation of the challenge. The challenge should be formulated on the 'strategic objective'-level in the pyramid of the 'Nordic Five Level Structure' [figure 6]. This is important because it facilitates maximum solution space. The contracting authority should focus on the formulation of the challenge and leave the solution direction (completely) open. The solution direction can subsequently logically follow from the problem analysis and the diverging, clustering and converging activities. Therefore, it is recommended to formulated the challenge on a as high as possible level.

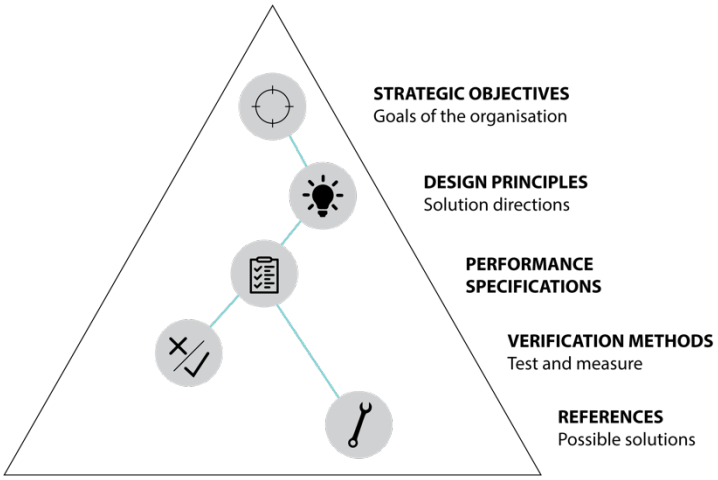

figure 6: Nordic Five Level Structure

2 Check the availability of a suitable solution in the market

When the challenge is defined, it needs to be verified whether this challenge can be fulfilled with solutions already available on the market. This can be done by conducting:

- Desk research; also known as a *market exploration*.
- A meeting; also known as a *market consultation*[5].

In this exploration and consultation, the level playing field needs to be guarded. Therefore, practically seen, the demand for interaction needs to be published by means of a request for participation.

3 Decide where to publish the request for participation in the market consultation

After conducting desk research, you might still not be sure whether the challenge can be fulfilled with solutions already available on the market. Because a solution may be found outside the 'standard' market, it is recommended to invite a broad group of parties for a market consultation. Therefore, you should consider publishing the request for participation in the market consultation on platforms beyond TenderNed.nl and Ted.europe.eu[6]. Suggestions for further spreading are (and not limited to): Facebook (groups), Twitter, LinkedIn (groups), Instagram, newsletters, papers, trade magazines, etc.

Options:	TenderNed.nl	Ted.europe.eu	Beyond TenderNed.nl / Ted.europe.eu

[5] In this context, 'market consultation' is meant as the possibility of interaction between the contracting authority and market parties preliminary to a procurement process. The subjects of discussion and the set-up can differ from the 'general known' set-up of 'market consultation' in which information is provided about the specified demand and the corresponding intended procurement process and contract conditions (Directive 2014/24/EU Art 50).

[6] Publication on Ted.europe.eu needs to be applied when: the contract value is above the European threshold for public contracts and / or the contract does include cross-border interest. This is further elaborated in appendix 01 of the thesis report.

4 Decide whether or not to facilitate setting up the 'solution finding'-process and 'partner finding'-process in collaboration with potential tenderers

It is advised to set-up the 'solution finding'-process and the 'partner finding'-process in collaboration with potential tenders. After all: market parties will be best facilitated with the process design which suits their own needs. This setting up session can best take place in a plenary physical market consultation. Depending on the degree of influence provided to the tenders, there are three options:

Options:	Set up the development process and procurement process without input of market parties.	Let market parties exert little influence on the set-up of the development process and funnelling process.	Set up the development process and funnelling process in collaboration.

5 Facilitate clarification of the formulated challenge

Mutual understanding of the formulated challenge, is prerequisite for a creative process. Therefore, the contracting authority should facilitate market parties to ask questions about the voiced demand and let them determine if the demand formulation is suitable for development in a procurement process. It is advised to facilitate this clarification process in a plenary physical market consultation.
In this phase of the creative process it is important to focus on the problem itself. Potential solution directions should be 'parked'; they could be used as input for awarding [step 12].

6 Facilitate the translation of the defined challenge into a [re-]framed problem

The translation of the defined challenged into the [re-]framed problem requires unrestricted, rapid and direct interaction and feedback. This can be best facilitated by physical presence of the contracting authority, the creative facilitator and the market parties in the same room. This translation process can be considered the start of the parallel progressing 'solution finding'-trajectories of the tenderers ['section [B]: guide', subsection 03].

The purpose of the translation of the *defined challenge* into the *[re-]framed problem* is twofold:

- To (further) open up the solution space for idea generation & -selection and prototyping & testing. To maximise the solution space, it is advised to specify the [re-]framed problem on the 'strategic objectives'-level [step 1].
- To minimise the information transfer error sensitivity between the problem owner and the resource group regarding the interpretation of the problem definition.

Participation in this translation process may not unlawfully influence the position of the tenderers before the start of the procurement process. Hence, it is recommended to let this transformation take place in a negotiation round. It should be noted that information about, for example a potential solution direction, can be kept confidentially but the level playing field should be secured (Dutch procurement law 2012 (2016) Art 2.126a par 6)[7].

[7] During the procurement process, clarification of procurement documents could be requested. The requested clarification could relate to amongst others the demand formulation, the funnelling process, the development process or the business case. To guard the 'level playing field' this requested clarification needs to be provided by means of notes of information (Dutch procurement law 2012 (2016) Art 2.53). In general, applies: when clarification is requested regarding the procurement documents, this information needs to be provided to

Checklist for the 'demand formulation'-phase	✓
▪ There is no solution available on the market.	
▪ The starting point of the solution finding process and the partner finding process meet the interests of both the problem owner and the resource group.	
▪ The defined challenge is translated into a [re-]framed problem.	

all optional partners. When information is requested regarding for example a solution direction, this information could be kept confidentially when this does not distort the competition (Dutch procurement law 2012 (2016) Art 2.126a par 6).

02 PARTNER FINDING

The objective of the partner finding process is to facilitate the funnelling process towards the selection of a suitable partner for the solution finding process. The partner finding process exists of three main steps and four sub-steps. The place of these steps in the procurement process is indicated in figure 7. The content of the steps is elaborated below.

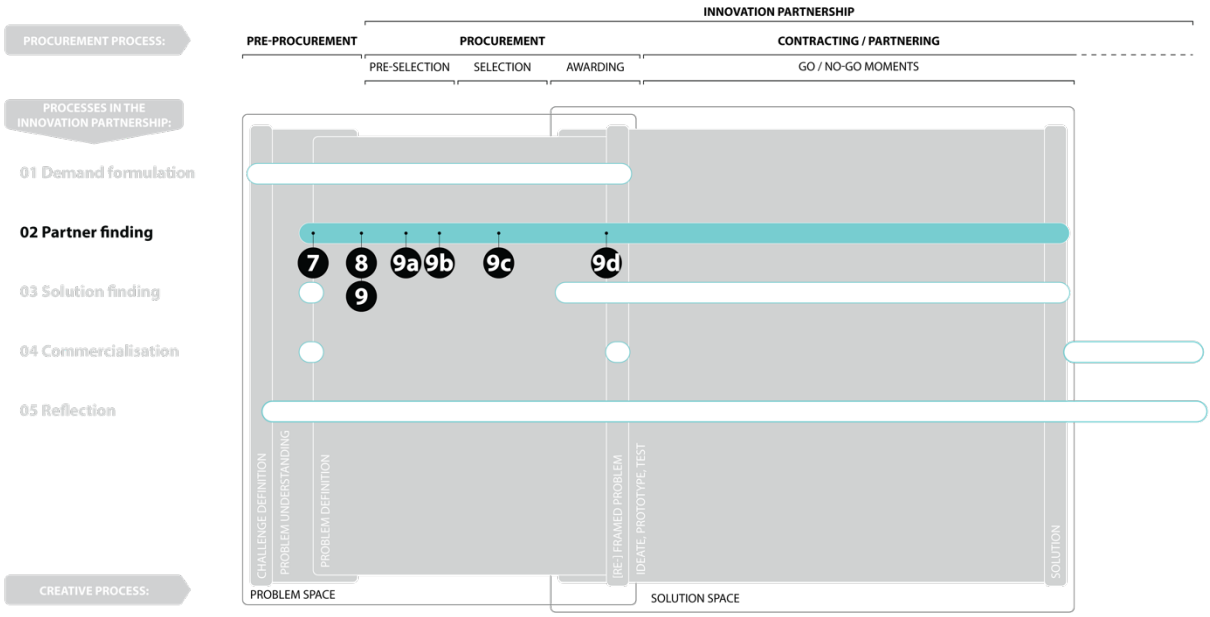

figure 7: steps in the partner finding process

7 Facilitate optional partners in increasing their solution finding strength

Optional partners can be facilitated in increasing their solution finding strength with the following three steps:

- Make the defined challenge known for an as wide as possible group of parties [step 3]. A solution might be found outside the group of 'standard' market parties.
- Stimulate consortium forming by facilitating cross-sectoral and cross-specialisation collaboration.
- Facilitate networking events to stimulate consortium forming.

Subsequently, the number of market parties per funnelling round can be determined and the funnelling criteria can be set-up.

8 Determine the number of market parties per funnelling round

The number of parties, participating the procurement process, could be reduced per funnelling round. It should be determined on beforehand what number of parties could participate per round. As defined in procurement law, at least three parties should be able to participate in the procurement process of the innovation partnership. There is no maximum, however, the number of participants should be proportional to the assignment. Moreover, awarding to more than one partner could be enabled [figure 8].

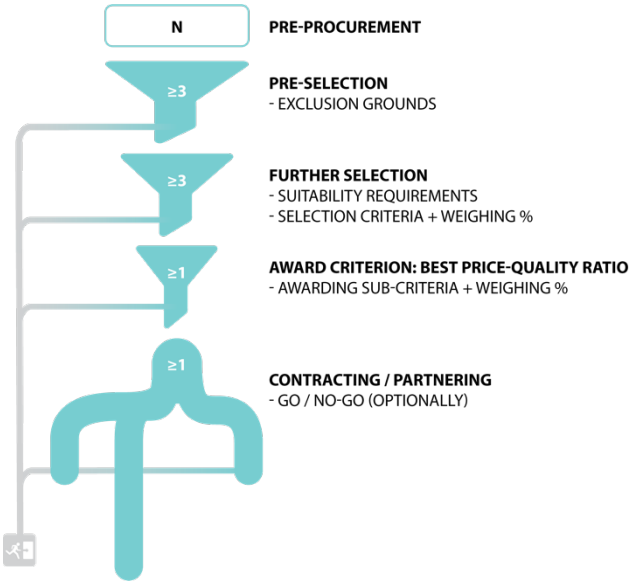

figure 8: number of market parties per funnelling phase

9 Set up funnelling criteria

In the innovation partnership, five groups of 'funnelling-criteria' can be identified [figure 8]. Some of these criteria are mandatory and some are facultative:

Mandatory funnelling criteria (procurement)	**Facultative funnelling criteria** (procurement)	**Facultative funnelling criteria** (contracting)
▪ Mandatory exclusion grounds ▪ Awarding criteria	▪ Facultative exclusion grounds ▪ Suitability requirements ▪ Selection criteria	▪ Go/no-go moments

It should be decided whether or not to apply the facultative funnelling criteria. The benefit of applying these criteria is that they increase the level of control over the number of participants and the quality of the optional partners, participating in the funnelling process. Further considerations per criterium are provided below.

9a Apply exclusion grounds

Procurement law requires a contracting authority to exclude not integer market parties from participation in a procurement process. This can be done based on mandatory and optionally via facultative exclusion ground. Considerations for applying the exclusion grounds are:

- After pre-selection, it should be certain that the not-integer parties are excluded form participation in the procurement process.
- Exclusion grounds are limitative regarding the professionality of the tenderers.
- Extra exclusion grounds can be applied when considered proportional.

Options:	Apply mandatory exclusion grounds (Dutch procurement law 2012 (2016) Art 2.86).	Apply mandatory (Dutch procurement law 2012 (2016) Art 2.86) and facultative exclusion grounds (Dutch procurement law 2012 (2016) Art 2.87).

Suitability criteria, selection criteria and awarding sub-criteria

The funnelling could be based on suitability requirements, selection criteria and awarding sub-criteria. The considerations and recommended options per funnelling criterium are described below.

9b Decide to (not) apply suitability criteria

Considerations for applying suitability criteria:

- Suitability criteria could help to exclude parties which are expected not capable of meeting the minimal demanded performance.
- Suitability criteria have a pass or fail character.
- The application of suitability criteria should be well thought out:
  - Financial criteria could exclude technical capable but financially too small market parties to individually develop something 'new' or 'significantly improved'.
  - Criteria regarding the professional ability of projects performed in the past could not be of added value in the context of the development of something 'new' or 'significantly improved'.

Options:	Apply suitability criteria to further limit the number of market parties which can participate in the innovation partnership.	Do not apply suitability criteria and enable all not-excluded parties to participate in the innovation partnership.

Optionally: set up suitability criteria

Regarding the suitability criteria, requirements may be imposed ensuring that economic operators possess the necessary:

- Financial and economical capacity;
- Human and technical resources;
- Experience to perform the contract to an appropriate quality standard.

Following these requirements, market parties can be requested to demonstrate information about:

- Financial statements and insurance.
- A sufficient level of experience by providing suitable references from contracts performed in the past.
- When regarding installation work, services or works, the professional ability of the economic operators to provide the service or to execute the installation or the work may be evaluated with regard to their skills, efficiency, experience and reliability (Dutch procurement law 2012 (2016) §2.3.6.1.).

9c Decide to (not) apply selection criteria

Considerations for applying selection criteria;

- Selection criteria could help to rank parties which are expected best capable of meeting the minimal demanded performance.
- After selection, it should be certain that the not-excluded parties are suitable development partners.
- Selection criteria are based on a scoring principle.
- Multiple selection rounds could be applied.
- *[see the info under action 9d for more considerations about the set-up of the selection criteria].*

Options:	Apply selection criteria, to rank the optional partners for participation in the 'solution finding'-process.	Do not apply selection criteria and enable all not-excluded parties to participate in the 'solution finding'-process.

Optionally: set up selection criteria

Options:

It is advised to select optional partners on:

- General knowledgeability and expertise of (individual employees of) the company; in particular with regard to their:
  - Interaction-match[8].
  - Innovation potential[9].
- Effectiveness of a used plan of action of projects performed in the past.
- General vision on themes of the challenge.
- *[see the info under action 9d for more options for the set-up of the selection criteria].*

9d Set up the awarding sub-criteria in the context of award criterion: 'best price-quality ratio'.

Procurement law demands to set-up awarding sub-criteria in the context of the award criterion: 'best price-quality ratio'. *It should be noted that both selection and awarding sub-criteria can relate to the knowledgeability and expertise of the tenderers. This implies that awarding sub-criteria can cover both the 'partner finding'- and the 'solution finding'-process.* This creates amongst others the possibility to place the ideation-, prototyping-, and testing-activities after the awarding of a contract [step 11].

Considerations for awarding sub-criteria in the context of 'partner finding':

- Awarding on solely qualitative aspects can be facilitated when working with a fixed price.

Considerations for both selection criteria and awarding sub-criteria:

- After selection/awarding, it should be certain that the not-excluded parties are suitable development partners.

[8] Procurement for innovation has heavier requirements for interaction between the contracting authorities and the tenderers than does procurement of known solution directions. Centrally important aspects for procurement for innovation are: unrestricted problem owner-problem solver interaction and rapid and direct feedback. This is further explained in chapter 08 of the thesis report. Interaction-match can be objectified through a collaboration assessment.

[9] Innovation potential can be measured by means of a creative equity scan. The set-up of this scan is developed by design agency VanBerlo (2018) and is further elaborated in appendix 05 of the thesis report.

- Application of a creative equity scan is advised to select/award partners with sufficient innovation potential.
- Procurement for innovation has heavier requirements for interaction between the contracting authorities and the tenderers than does procurement of known solution directions. Application of a collaboration assessment is advised to measure the interaction-match.
- Selection or awarding, based on norms and values, can increase the chance of success of the innovation process.
- The influential strength of innovative but (financially) small consortium partners should be assured.

Options:

In the context of the 'partner finding'-phase in the innovation partnership, it is advised to award optional partners on:

- Knowledgeability and expertise of the company with regard to the assignment at hand (in particular with regard to the creative equity).
- Knowledgeability and expertise of specific employees of the company with regard to the assignment at hand.
- …

Checklist for the 'partner finding'-phase	✓
▪ Parties which are not allowed to participate, are excluded.	
▪ (Optionally) parties are ranked on their suitability to become development partner.	
▪ One or multiple development partners are chosen.	

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03 SOLUTION FINDING

The objective of the 'solution finding'-process is to facilitate the development process of the construction-related innovation. The 'solution finding'-process exists of three steps. The place of these steps in the procurement process is indicated in figure 9. The content of the steps is elaborated below.

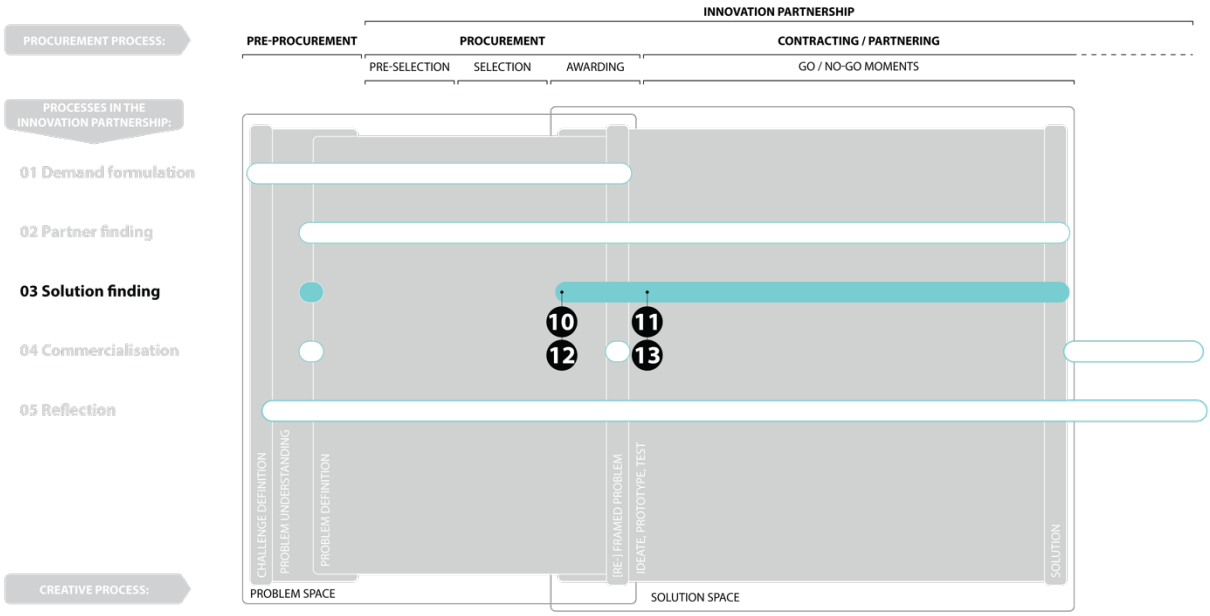

figure 9: steps in the solution finding process

In the 'demand formulation'-process the following steps were undertaken:

- The strategic objectives of the challenge were formulated [step 1].
- The readily availability of a solution was checked [step 2, 3].
- The 'solution finding'-process was set-up [step 4].
- The formulated challenge was translated into a [re-]framed problem [step 5 and 6].

The 'solution finding'-process of this guide, is about the ideation, prototyping & testing activities for finding a solution for the [re-]framed problem [figure 10]. Both the negotiation rounds and the contract/partnering-phase can facilitate these activities. The implications of these set-ups for the solution finding process are elaborated below. Note that iteration between the 'design principles', 'performance specifications', 'verification methods' and 'references' [see 'Nordic Five Level Structure', figure 6] in the ideation, prototyping and testing activities [figure 10] must be possible [step 1].

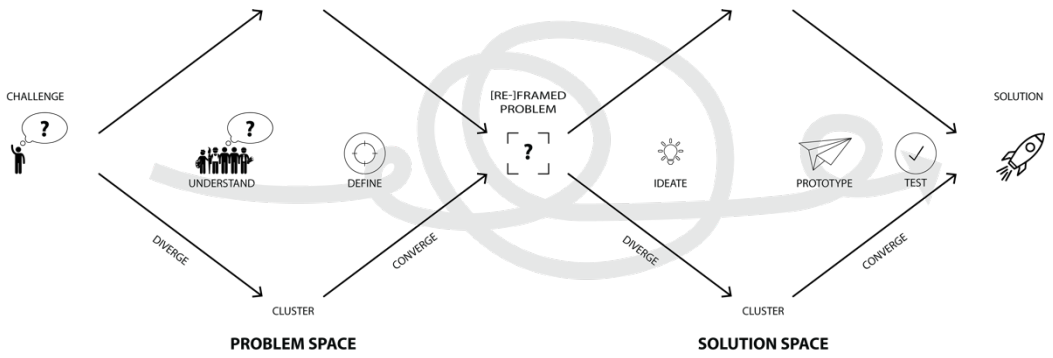

figure 10: a creative process

10 Set-up of negotiation rounds

Options:

Solely the *[re-]framing of the problem* takes place in the negotiation phase. Implications: ▪ The [re-]framing capabilities of optional partners could be applied as awarding sub-criterium. ▪ Awarding on effectiveness of 'plan of action' is recommended to facilitate *idea generation & selection* and *prototyping & testing activities* in the contracting/ partnering-phase.	The *[re-]framing of the problem* and *ideation* take place in the negotiation phase. Implications: ▪ Awarding on 'idea direction' is recommended. ▪ *Prototyping & testing activities* should take place in the contracting/ partnering-phase.	The *[re-]framing of the problem*, *ideation* and *prototyping & testing* take place in the negotiation phase. Implications: ▪ Awarding on the performance of the 'idea' is recommended. ▪ Only *realisation and commercialisation* take place in the contracting/partnering-phase.

It is recommended to discuss the follow points in the negotiation phase:

- The process design of the development process;
- The [re-]framing of the problem;
- The business case and the contract terms;
- Social aspects of collaboration and interaction;
- Team composition;
- Depending above stated options: the idea, prototype or test results;
- …

11 Set-up of contract/partnering-phase

Be aware: the creative playing field also needs to be guarded in the contracting/partnering-phase. Practically this means that it is recommended to apply a type of alliance contracting to fully facilitate the reciprocity principle.

Options:

Ideation and *prototyping & testing* take place in the contract/partnering-phase. Implications: ▪ Awarding on 'plan of action' is recommended to facilitate *idea generation & selection* and *prototyping & testing activities* in the contracting/partnering-phase. ▪ Sub-contracts could be used to facilitate *idea generation & selection*	*Prototyping & testing* take place in the contract/partnering-phase. Implications: ▪ Awarding on 'idea direction' is recommended to facilitate *prototyping & testing activities* in the contract/partnering-phase. ▪ Sub-contracts could be used to facilitate *prototyping & testing*

and *prototyping & testing activities* in separate contracting/ partnering-phases.	*activities* in separate contracting/ partnering-phases.

12 Set up the awarding sub-criteria in the context of award criterion: 'best price-quality ratio'

The set-up of the awarding sub-criteria should match the decisions made under step 9, 10 and 11.

Considerations for awarding sub-criteria in the context of 'partner finding':

- Awarding on solely qualitative aspects can be facilitated when working with a fixed price;
- After awarding, it should be certain that the not-excluded parties are suitable development partners.

Options:

In the context of the 'solution finding'-phase in the innovation partnership, contracting authorities are advised to award optional partners on: ▪ Their plan of action for the 'solution finding'-process; ▪ Their idea; ▪ The performance of the idea; ▪ The set-up of the business case. ▪ …

13 Decide to (not) set up go/no-go moments

Go/no-go moments are the funnelling moments which can be applied in the contracting/partnering-phase.

Considerations for setting up go/no-go moments are:

- Lengthening the funnelling trajectory can shift the 'solution finding'-process from before awarding to after awarding;
- Lengthening the funnelling trajectory, can facilitate the 'solution finding'-process with termination-options under contract terms;
- Development partners can be asked to increase the certainty of the performance of a proposed solution in phases.

Options:

Decide to apply go/no-go moments and extent the funnelling process.	Decide to not apply go/no-go moments. The last funnelling moment is the award decision.

Optionally: set up the go/no-go moments

Options:

It is advised to use the following sequential criteria to set-up the go/no-go moments: ▪ Analysis of the context of the [re-]framed problem; ▪ Translation of strategic objectives into design principles [Nordic Five Level structure, figure 6]; ▪ Translation of design principles into performance specifications [Nordic Five Level structure, figure 6]; ▪ Sketch; ▪ Provisional draft;

- Final draft;
- Technical draft;
- Prototype;
- …

Checklist for the solution finding process	✓
▪ The ideation process is facilitated.	
▪ The prototyping & testing process is facilitated.	
▪ The awarding sub-criteria are set.	
▪ Go/no-go moments in the contracting/partnering-phase are defined.	

04 COMMERCIALISATION

The objective of the commercialisation process is to introduce the developed solution on the market. The commercialisation process exists of two steps. The place of these steps in the procurement process is indicated in figure 11. The content of the steps is elaborated below.

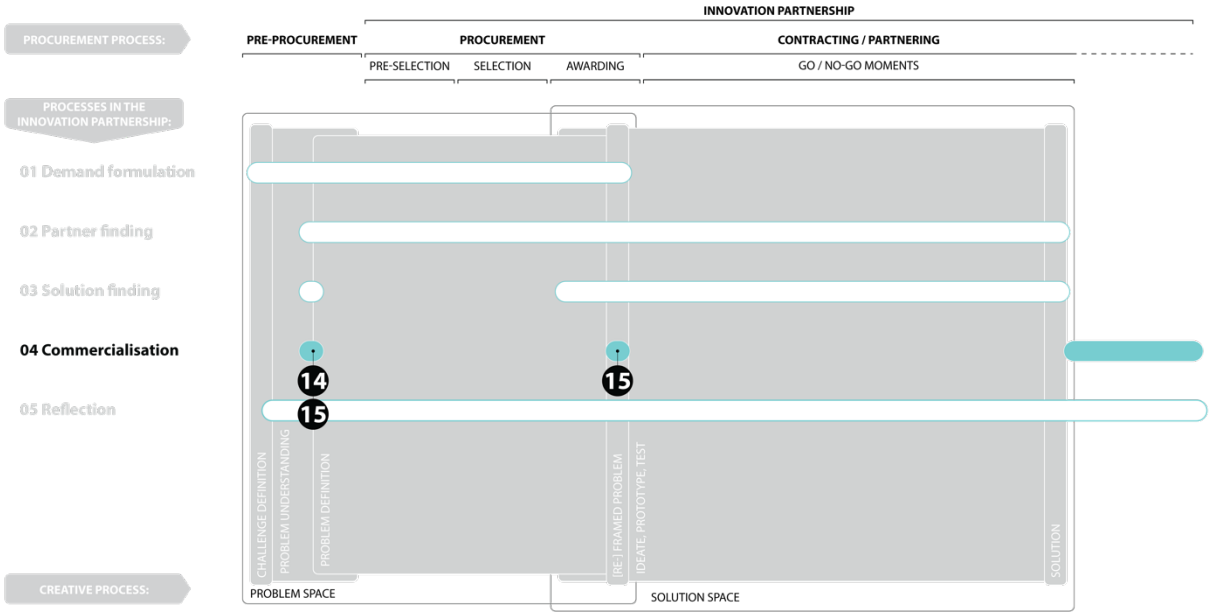

figure 11: steps of the commercialisation process

In the context of the innovation partnership, 'commercialisation' mainly enhances the business case aspects belonging to the introduction of the develop solution on the market. It is recommended to discuss the business case aspects during the pre-procurement phase and in the negotiation rounds during procurement. In these discussions, the reciprocity principle of the creative playing field should be guarded[10].
The commercial development takes place after the 'solution finding'-phase is completed [figure 11]. Practically seen, commercial development could be a sub-contract in the purchasing of the developed solution.

14 Decide to set (a part) of the contract and business case in collaboration

Options:	Set the contract and the business case in collaboration with the optional partner.	Set a part of the contract and business case in collaboration with the optional partner.

15 Discuss contract and business case related subjects

Options:	Points for discussion in the contract and the business case are the distribution of: ▪ The costs of the 'partner finding'-phase and the 'solution finding'-phase. ▪ Risks of the 'solution finding'-phase.

[10] Read: cost sharing, risk sharing and benefit sharing.

- The intellectual property[11], belonging to the developed solution.
- Profits resulting from the commercial development.
- …

Checklist for the commercialisation process	✓
▪ Costs are distributed.	
▪ Risks are distributed.	
▪ Profits are distributed.	
▪ Intellectual property is distributed.	

[11] Options for allocation of the intellectual property are: open source; selling; usability agreement; divide the intellectual property in the context of the business case; make a special purpose vehicle owner of the intellectual property (e.g. BV or VOF).

05 REFLECTION

The objective of the reflection process is twofold:

- To facilitate iteration between two creative sub-phases. This iteration demands reflection to determine the set-up of the successive phase.
- To facilitate feedback about the innovation partnership. The innovation partnership is a relatively new procurement procedure. To show the (un)suitability of the innovation partnership to possible future users and participants, the followed process should be evaluated, and the outcomes of this reflection should be published.

It is advised to apply a minimum of five reflection moments. The place of these moments in the procurement process is indicated in figure 12.

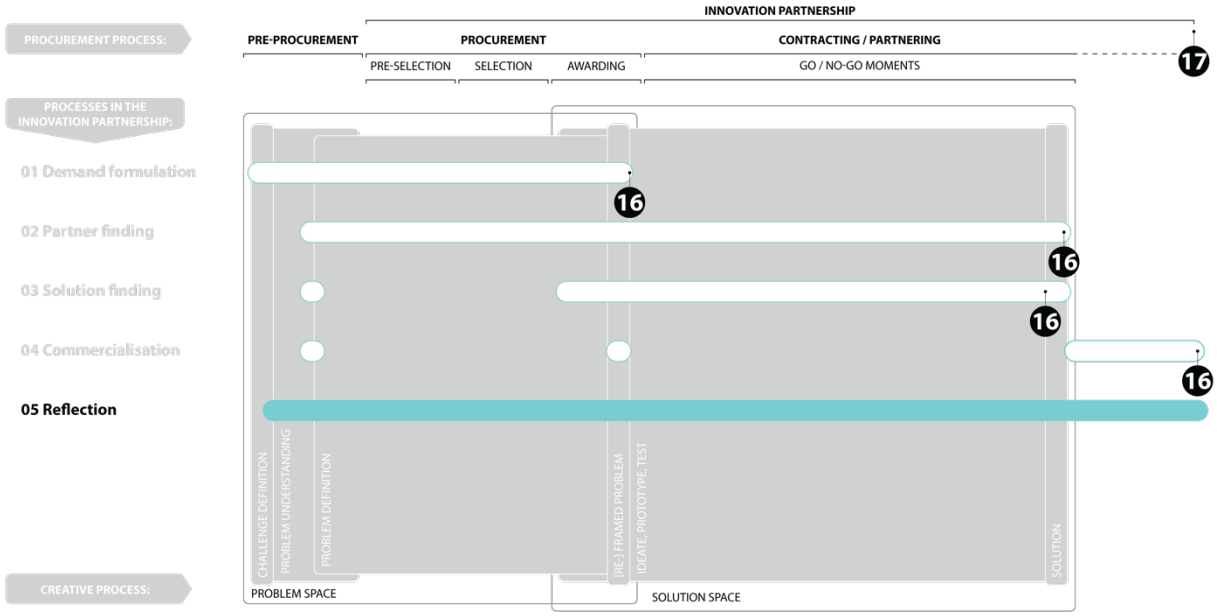

figure 12: steps of the reflection process

16 Facilitate reflection during the innovation partnership.

17 Facilitate reflection about the innovation partnership.

Reflection is facilitated during:	
▪ Demand formulation;	✓
▪ Partner finding;	
▪ Solution finding;	
▪ Commercialisation;	
▪ Innovation partnership.	

CONCLUDING REMARKS

The following processes are set-up:	✓
▪ Demand formulation;	
▪ Partner finding;	
▪ Solution finding;	
▪ Commercialisation;	
▪ Reflection.	

Well done! You have set-up an innovation partnership. Enjoy the progress of your process design.

The following processes have been completed:	✓
▪ Demand formulation;	
▪ Partner finding;	
▪ Solution finding;	
▪ Commercialisation;	
▪ Reflection.	

Well done! You have completed an innovation partnership.

How did it go? Did this guide help to design a set-up for an innovation partnership? Are there remaining questions? Please let me know. Feel free to get in touch.

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